The Effect of Alcohol Intoxication on Emotion Perception and Perceptions of Ability

Sarah Anne Skromanis (BPsychSc)

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Statement of Sources

I declare that this report is my own original work and that contributions of others have been duly acknowledged.

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Sarah Skromanis Date

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List of Acronyms

ACS	Advanced Clinical Solutions
ANDI	Adjusted Normalised Discrimination Index
AUDIT	Alcohol Use Disorders Identification Test
BAES	Biphasic Alcohol Effects Scale
BMI	Body Mass Index
BrAC	Breath Alcohol Concentration
BRS	Beverage Rating Scale
ERT	Emotion Recognition Scale
FIML	Full Information Maximum Likelihood
K10	Kessler Psychological Distress Scale
O/U	Overconfidence/Underconfidence
SEQ	Social Emotional Questionnaire
TBI	Traumatic Brain Injury
TLFB	Timeline Followback

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Sarah Anne Skromanis (BPsychSc)

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Abstract

Alcohol-fuelled violence has become increasingly reported in and 'exploited' by the Australian media. While links between alcohol consumption and violence are well established, the possible mechanisms underlying these negative social behaviours are poorly understood. This study aimed to ascertain whether alcohol intoxication impairs individuals' emotion perception abilities in a manner similar to other clinical populations, such as schizophrenia and traumatic brain injury (TBI), which demonstrate similar neuropathological profiles. A supplementary aim of the study was to examine whether accuracy of appraisals of emotion perception ability are impaired. Following quasi-random assignment to counterbalance for gender, 64 participants were administered either an alcohol (M_{age} = 24.55, SD = 3.38) or placebo (M_{age} = 22.70, SD = 4.80) beverage. Emotion perception abilities were then assessed using the Emotion Recognition Task (ERT). Insight into performance was also measured by obtaining confidence ratings from zero to 100% for each viewed emotion. The study found that alcohol intoxicated individuals were less able to correctly identify negative emotions than the non-intoxicated individuals at moderate-to-high levels of emotion intensity. They also demonstrated significantly less insight into their performance regardless of emotion type. These results offer invaluable information to further our understanding of the possible mechanisms underlying alcohol-fuelled violence.

The Effects of Alcohol Intoxication on Emotion Perception and Perceptions of Ability

Alcohol forms a prominent part of Australian culture and is commonly consumed to regulate and facilitate social interactions (Cooper, Frone, Russell, & Mudar, 1995). Alcohol's psychoactive abilities may reduce stress and anxiety and induce states of relaxation, euphoria, and disinhibition, making it a desirable social lubricant (Kano et al., 2003). Alcohol consumption in Australia is highly prevalent with recent Australian Bureau of Statistics (ABS, 2015) data indicating that 80.6 percent of Australians aged over 18 years consumed alcohol between 2014 and 2015. During the same period, 44.0 percent of Australians aged over 18 years exceeded the National Health and Medical Research Council's 'single occasion risk guideline' of consuming more than four standard drinks in a single session. This excessive drinking was also reportedly more common among young adults, with 69.4 percent of males and 60.6 percent of females aged between 18 and 24 years exceeding the single occasion risk guidelines. In comparison, 65.3 percent of males and 36.1 percent of females aged between 35 and 44 years exceeded the single occasion risk guideline.

Excessive alcohol consumption is particularly concerning given its potential role in initiating negative social behaviours, such as aggression (Attwood, Ataya, Benton, Penton-Voak, & Munafò, 2009). Links between alcohol consumption and aggressive behaviours (e.g., violence towards others) are well established in the scientific literature (Hoaken & Stewart, 2003). Local Australian data has also indicated that a majority of victims who had sustained a physical assault aged between 25 and 34 years (67 percent) attributed the assault to alcohol and/or another illicit substance (ABS, 2015). Alcohol-fuelled violence, such as "king hits" in

particular have become increasingly reported in and ‘exploited’ by the Australian media (Pilgrim et al., 2014). “King hits” are characterised by a sudden knock to the head, debilitating the victim and causing them to become unconscious. Between 2000 and 2012, a staggering 90 Australians were victims of fatal king hits, with alcohol being recognised as a contributing factor in 73 percent of these cases. Despite the established link between alcohol intoxication and violence, the possible underlying mechanisms of these negative social behaviours are poorly understood.

One possible explanation for the negative social behaviour seen in intoxicated individuals, is poor ability to accurately recognise the emotions displayed by other people. The ability to correctly recognise emotions is a fundamental aspect of human interaction, and deficits in this area may result in misunderstandings or incorrect interpretations of intent and reaction (Attwood et al., 2009; Kornreich et al., 2001; Philippot et al., 1999; Uekermann & Daum, 2008; Walter et al., 2011).

Emotion Perception

Facial expressions are an important channel in which emotions and feelings are conveyed (Carton, Kessler, & Pape, 1999). Accurate perception of these facial expressions is essential for interpersonal communication and is important in obtaining and maintaining successful relationships (Kornreich et al., 2001; Philippot et al., 1999). Emotion perception deficits are therefore likely to negatively impact individuals’ capacity to engage in activities necessitating interactions with others, such as employment, and leisure activities. Emotion perception deficits have been attributed to a number of clinical populations, including traumatic brain injury (TBI) and schizophrenia, whereby reduced social functioning is evident (Kee, Green, Mintz, & Brekke, 2003; Ponsford, Olver, & Curran, 1995). In particular, these groups demonstrate difficulties in independent living, maintaining employment, and

sustaining meaningful social relationships. These difficulties highlight the importance of emotion perception in successful daily functioning.

Regions of the Brain Involved in Emotion Perception

Emotion perception is one of the most developed perceptual skills in humans (Haxby, Hoffman, & Gobbini, 2002). Neuroimaging and lesion studies have both revealed a number of different brain regions that mediate emotion perception abilities. These include the orbitofrontal and medial pre-frontal cortex, the superior temporal cortex, the insular, and select regions of the amygdala (Breiter et al., 1996; Kumfor, Irish, Hodges, & Piguet, 2013; Repeiski, Smith, Sansom, & Repetski, 1996; Streit et al., 1999). The evolutionary development of the human brain has resulted in some of these structures being responsible for the recognition of specific emotional expressions (Haxby et al., 2002). The amygdala, for example, has long been recognised as having a central role in the recognition of, and response to, fearful stimuli (Davis, Walker, Miles, & Grillon, 2010; Sripada, Angstadt, McNamara, King, & Phan, 2011). More specifically, many studies have found increased amygdala activation in the presence of fearful emotional expressions (Adolphs, Tranel, Damasio, & Damasio, 1994; Breiter et al., 1996). The insular, a region of the brain closely associated with the amygdala, is particularly responsive to aversive stimuli and is predominantly activated in the presence of disgust facial stimuli (Calder, Lawrence, & Young, 2001; Sprengelmeyer et al., 1996). The specific structures responsible for the detection of positive emotions (i.e., happiness and surprise) however, remain less understood (Kumfor et al., 2013).

Neuropathology and Alcohol Intoxication

The regions of the brain involved in emotion perception ability have also been found in neuroimaging studies to be implicated in alcohol-intoxicated states. In

particular, alcohol-intoxicated individuals display attenuation of the bilateral amygdala and the insular, compromising their abilities to correctly identify fearful and disgust emotional facial expressions (Padula et al., 2011; Sripada et al., 2011). Given alcohol is considered to be a drug that produces anxiolytic effects (i.e., reduced stress and anxiety), the attenuated activation of these brain regions for negative stimuli in this group is highly intuitive. Further, evidence has also indicated alcohol intoxicated individuals' preferential recognition for positive stimuli (e.g., happiness and surprise), which may be due to reduced abilities to recognise negative facial stimuli (Kano et al., 2003).

Neuropathology in Clinical Populations

Similar regions of the brain also appear to be compromised in alternative clinical populations, such as TBI and schizophrenia, who are known to have difficulties in emotion recognition. Studies have shown that the pre-frontal and temporal lobes, the amygdala, and the fusiform gyrus, are particularly affected in those with a TBI (Hornak, Rolls, & Wade, 1996; Radice-Neumann, Zupan, Babbage, & Willer, 2007). Croker and McDonald (2005) found that individuals with a TBI were equally as effective at recognising positive (i.e., happiness, and surprise) emotional expressions as those without a TBI. Correct identification of negative (i.e., sadness, disgust, and fear) emotional expressions, however, were significantly worse among those with a TBI, except for anger stimuli, in which performance between the two groups was similar. Similar findings have been reported in individuals with schizophrenia, with the amygdala, the anterior insular, and the ventral striatum being recognised as contributing to emotion perception processes (Phillips, Drevets, Rauch, & Lane, 2003). Similar to alcohol-intoxicated individuals and those with a TBI, schizophrenic patients display reduced amygdala activation in response to fear

stimuli (Phillips et al., 1999). Further, individuals with schizophrenia demonstrate reduced volume of bilateral insular grey matter (Saze et al., 2007), supporting findings of abnormal recognition of disgust stimuli (Kohler et al., 2003).

A recent study conducted by Rosenberg, McDonald, Dethier, Kessels, and Westbrook (2014) further demonstrated the propensity for individuals with a TBI to display deficits in emotion perception across a range of emotion intensities. An important finding of their study was that not only were TBI individuals impaired in detecting negative facial stimuli, but they were also impaired in detecting happy facial stimuli, albeit at lower levels of emotion intensity. Thus, impairments to emotion perception abilities may be more widespread in some clinical groups than initially thought.

Alcohol and Emotion Perception

In recent decades, there has been an emergence of research into the effects of alcohol use on social abilities. However, much of this research has been aimed at examining the effects of chronic alcohol consumption. Chronic alcohol consumption is associated with negative social implications, such as isolation and reduced interpersonal relationships (Maurage, Campanella, Philippot, Martin, & De Timary, 2008). Emotion perception deficits in particular have been identified as a prominent contributor of social and communication impairments among alcoholics or those diagnosed with an alcohol use disorder (Kornreich et al., 2001; Maurage et al., 2008; Philippot et al., 1999).

Alcohol Use Disorder is characterised by problematic patterns of alcohol use resulting in significant clinical impairment or distress, as manifested by problems such as the cessation of occupational, social and recreational activities because of alcohol; continued alcohol use despite continuous social or interpersonal problems

caused by the effects of alcohol; and desires or unsuccessful attempts at controlling alcohol use (American Psychiatric Association (APA), 2013). Alcohol use disorder is also associated with an array of cognitive impairments, such as deficits in attention; memory; emotional prosody; and executive functions, which are believed to arise from the functional and structural brain changes that result from chronic alcohol use (Uekermann & Daum, 2007, 2008). The combination of these cognitive deficits and impaired emotion perception may help explain the social deficits and negative social responses, such as aggression, seen among those consuming excessive proportions of alcohol (Uekermann & Daum, 2007).

Emotion perception deficits were demonstrated by Philippot et al. (1999) in recently diagnosed alcohol dependent individuals. A series of static photographs, each displaying one of five basic emotions (happiness, anger, sadness, disgust, and fear) were used as the emotion perception stimuli. Each emotion was presented on two male and two female Caucasian faces at four different intensity levels. A 7-point scale (0 = 'not at all', 7 = 'very intensely') for eight emotions (happiness, sadness, fear, anger, disgust, surprise, shame, and contempt) was employed as a measure of perception accuracy. Accurate identification of an emotional expression occurred when the scale receiving the highest rating corresponded to the target emotion being displayed. The authors concluded that individuals with alcohol dependence disorder were significantly worse at correctly identifying happy, sad, disgust, and angry emotional expressions in comparison to controls. It was also found that expression intensity (i.e., slight angry face versus full angry face) did not influence perception accuracy for happy, sad, and anger stimuli. However, when fear stimuli were presented at 70 percent and 100 percent intensity levels, perception accuracy was poorer for alcohol dependent individuals than controls. While these results support

the existence of emotion perception deficits among chronic alcohol users, the use of static images may not accurately reflect the dynamic nature of emotional expressions in humans. As such, it is possible that some emotion perception deficits in alcohol dependent individuals were not detected in this study.

Kornreich et al. (2001) extended on Philippot et al. (1999) findings by examining *enduring* emotion perception deficits (i.e., deficits over time) among abstainers (abstained for two months) and recently detoxified (abstained for two to three weeks) individuals. Employing the same methodology as Philippot et al., Kornreich et al. found that both the abstainers and detoxified groups were significantly worse than controls at decoding emotional expressions. However, abstainers were significantly more accurate than recently detoxified individuals, with the exception of expressions depicting sadness, anger, and disgust in which their performance was similar. This indicated identification of negative emotions was particularly impaired in both the abstained and detoxified group. Interestingly, alcohol dependent individuals, whether abstinent or recently detoxified, also displayed little insight into their emotion perception deficits. This was argued by the authors to be a contributor of inappropriate social responding in these groups.

Alcohol-Intoxication and Emotion Perception

Research has more recently focused on the effects of alcohol intoxication on emotion perception abilities. Alcohol intoxication occurs as a result of recent ingestion of alcohol, leading to problematic behavioural or psychological changes, such as mood lability, impaired judgement, and inappropriate sexual or aggressive behaviours that develop during or shortly after alcohol consumption (APA, 2013). The mechanisms underlying these behavioural and psychological changes have been sparsely examined in alcohol intoxicated individuals.

Tucker and Vuchinich (1983) attempted to discover a possible mechanism underlying social behaviours following alcohol consumption. Specifically, Tucker and Vuchinich examined the effect of alcohol intoxication on emotion perception abilities, using a series of 14 standardised cross-cultural facial photographs depicting seven basic emotions (fear, anger, disgust, surprise, happiness, contempt, and sadness), each presented on a single female face. Seven 11-point scales (0 = 'no amount of the emotion is present', 10 = 'an extreme amount of the emotion is present'), each representing one of the basic emotions, was used to assess identification accuracy. Correct identifications occurred when the emotion receiving the highest rating corresponded with the target emotion. Consistent with chronic alcohol users' performance, alcohol intoxicated individuals were significantly less accurate at identifying emotional expressions than controls. Although these results support the existence of emotion perception deficits in alcohol intoxicated individuals, the authors did not provide results for the individual emotion types.

Difficulties in emotion detection among alcohol-intoxicated individuals, however, are not consistently reported, with some researchers arguing that intoxicated individuals are equally as effective at detecting emotional expressions as non-intoxicated individuals (Kamboj et al., 2013; Walter et al., 2011). One such study, conducted by Walter et al. (2011), examined the effect of alcohol intoxication on emotion perception abilities. Specifically, participants were presented with a series of video clips in which facial expressions gradually changed from a neutral to a fully expressed emotion. Each clip displayed one of six emotions (happy, sad, disgust, fearful, angry, and surprised), each of which were displayed on one of six individuals. While viewing each video clip, participants were instructed to press the space bar on a keyboard when they were able to detect an emotion emerging from a

neutral expression. Emotion perception ability in this study is therefore determined by the *intensity threshold* at which participants are able to correctly identify an emotion. Although Walter et al. examined the detection of all six basic emotions, only anger and happiness were analysed. Significant between group differences were not detected, indicating that alcohol intoxicated individuals were equally as capable at correctly identifying these emotion as non-intoxicated individuals at the intensity threshold level.

Whether alcohol-intoxicated individuals experience difficulties for select emotion types, and whether these difficulties are apparent across varying intensity levels remains unknown. However, based on similar neuropathological profiles between the previously mentioned clinical populations and alcohol intoxicated individuals, it is reasonable to expect that alcohol intoxicated individuals may also display emotion perception deficits, particularly for negative stimuli. Further, based on the findings of Rosenberg et al. (2014), it is also reasonable to expect that deficits in the identification of positive facial stimuli may also be present, albeit at lower intensity levels. These deficits are also likely to be exacerbated by an inability to recognise or have insight into emotion perception difficulties.

Insight – Comprehensive Dynamic Interactional Model

Insight refers to the ability to accurately recognise one's deficits (Toglia & Kirk, 2000). The Pyramid Model proposed by Barco, Crosson, Bolesta, Werts, and Stout (1991) explains insight as a hierarchical process. At the base of the hierarchy is intellectual awareness, which provides the foundations for the subsequent levels of the hierarchy; emergent and anticipatory awareness. 'Intellectual awareness' (sometimes also referred to as *trait* awareness) refers to the general ability to recognise that you have an existing deficit or generalised difficulty in performing a

particular type of task. Higher levels of intellectual awareness allows for recognition of any implications that may arise as a result of those deficits. The ability to recognise a problem when it occurs, on the other hand, is a process referred to as 'emergent awareness' (sometimes also referred to as *state* awareness). Emergent awareness sits in the middle of the hierarchy. Discrepancies between intellectual awareness and emergent awareness can exist. For instance, although intellectual awareness may be intact, emergent awareness may be deficient, consequently restricting an individual's ability to apply situation specific compensations. 'Anticipatory awareness' occupies the peak of the hierarchy and is largely dependent on the preceding levels. Anticipatory awareness extends on emergent awareness in that individuals are not only required to recognise the existence of a deficit in relation to performance on a specific task, but they are also required to anticipate future problems as a result of their deficit.

Toglia and Kirk (2000) argue that the hierarchical nature of Barco et al. (1991) model does not accurately reflect the dynamic nature of insight. Instead, Toglia and Kirk propose that insight is comprised of two interrelated domains: metacognitive knowledge and online awareness (Figure 1). Metacognitive knowledge refers to knowledge that exists prior to engaging in a task and consists of factual knowledge about task characteristics, knowledge of the cognitive processes required for the task, and strategies that are stored in long-term memory that assist task completion. Whereas metacognitive knowledge is what individuals bring to a task, on-line awareness occurs throughout a task and involves monitoring and regulation of individual performance. Self-monitoring involves the appraisal of task demands (anticipatory awareness) and awareness of performance on that given task (emergent awareness). Self-monitoring consequently results in self-regulatory

processes, such as changes in strategies and behaviour in response to task demands.

Inaccurate self-monitoring and overestimation of capabilities can prove problematic, such as in situations involving emotion perception. In particular, poor self-monitoring hinders individuals' abilities to adaptively alter strategies and behaviours in response to a given task, such as in an emotion recognition task. Accurate emotion perception is fundamental for successful social interaction (Attwood et al., 2009), as is the ability to accurately recognise emotion perception performance. Inaccurate performance perception may prevent withdrawal of negative, or initiation of desirable social responses. For example, perceptions of negative expressions, combined with inaccurate overestimation of perception performance, may prevent reductions in negative social responses. Similarly, perceptions of positive expressions, combined with inaccurate overestimation of performance, may prevent increases in desirable social responses. An understanding of the effects of alcohol on both emotion perception and insight into emotion perception ability are therefore both important considerations in understanding the possible mechanisms underlying alcohol-related negative social behaviours.

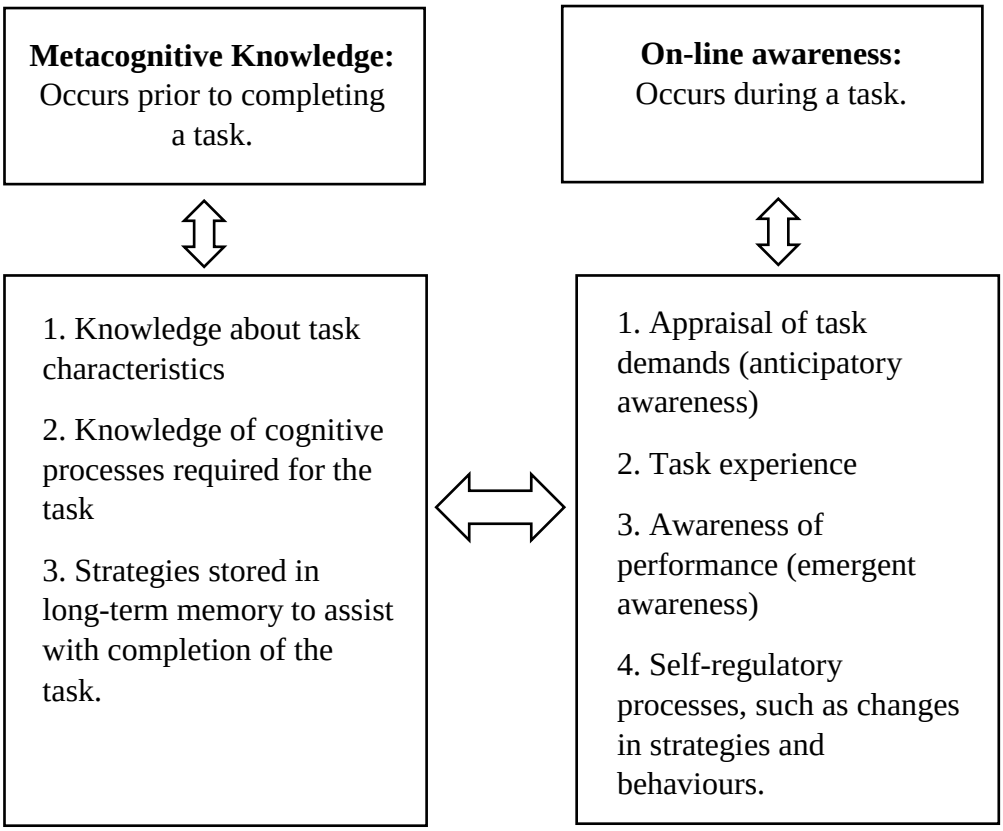

Figure 1. A model of awareness adapted from "Understanding Awareness Deficits Following Brain Injury" by J. Toglia and U. Kirk, 2000, *Neurorehabilitation, 15,* p. 60.

Aims and Hypotheses

The current study aims to investigate the effects of alcohol intoxication on the ability to perceive a full range of basic emotions (sad, happy, anger, disgust, fear, and surprise). Given that alcohol-intoxicated individuals are exposed to several emotions in their social environment, it is important to determine their ability to accurately perceive these various emotion types. Because previous research has examined only a limited range of emotions (Kamboj et al., 2013; Walter et al., 2011), or different combinations of many emotions (Kornreich et al., 2001; Philippot et al., 1999), an

understanding of how alcohol affects perception of the six universal basic emotions is yet to be obtained. Secondly, given that no comprehensive examination of emotion perception abilities across varying levels of emotion intensity has been conducted, the current study also aims to examine the effect of alcohol intoxication on emotion perception ability across five levels of emotion intensity (20%, 40%, 60%, 80%, and 100%). Lastly, based on the findings of Kornreich et al. (2001), the current study assesses participants' insight into their emotion perception abilities by obtaining a confidence rating ranging from 0% to 100% for each viewed emotion. Gaining an understanding of the difficulties alcohol-intoxicated individuals experience in recognising the emotions of others and in appraising their own abilities, may be fundamental to developing an understanding of why alcohol-intoxicated individuals engage in negative social behaviours.

It is specifically hypothesised that: (1) Alcohol-intoxicated individuals will have greater difficulties in correctly labelling negative, but not positive, emotional expressions than non-intoxicated individuals when emotions are displayed at higher (i.e., 80-100%) intensity levels. (2) Alcohol-intoxicated individuals will have greater difficulties in correctly labelling emotional expressions when they are displayed at lower (i.e., 20-60%) intensity levels regardless of emotional valence than non-intoxicated individuals. (3) Alcohol-intoxicated individuals will demonstrate a greater lack of insight into their emotion perception abilities when compared to non-intoxicated individuals.

Method

Design

The current study employed a mixed, single-blind, placebo-controlled, randomly-allocated design with three independent variables (condition: placebo and

alcohol; emotion: sad, happy, anger, disgust, fear, and surprise; and intensity: 20%, 40%, 60%, 80%, 100%) and one dependent variable (correct identification of emotions). Ratings of performance on emotion perception task items were also obtained using a zero to 100 percent scale.

Participants

Participants were 64 adults aged between 18 and 34 years. They were randomly allocated (using the randomisation function in Microsoft Excel) to either an alcohol intoxication or placebo condition. Basic demographic information for the participants stratified by condition is shown in Table 1. Independent samples *t*-tests indicated no differences between conditions on age or gender. A chi-square test of goodness-of-fit indicated that there were no significant differences in the proportion of males and females in the alcohol and placebo conditions, $\chi^2(1, N = 64) = .06$, $p = .802$ (see Table 1 for demographic data).

An a-priori power analysis was conducted prior to recruiting participants using G*Power 3.1.9.2 (Faul, Erdfelder, Lang, & Buchner, 2007) which indicated that a sample of 42 participants would be required to detect significance with a large effect size ($d = .80$, Cohen, 1992) (power = .80, alpha level = .05). Participants were recruited from the University of Tasmania's Newnham Campus and the wider community via advertising on SONA (a secure online electronic platform), delivery of presentations to first year psychology lectures, and flyers placed around the University Campus (see Appendix B). Students undertaking first year psychology units received three hours course credit, while all other participants received a single Village Cinemas movie voucher for their time.

Table 1

Descriptive and Inferential Statistics for Demographic Data

	Alcohol	Placebo	*t*	*df*	*p*	Cohens *d*
Male	16 (52%)	16 (49%)				
Female	15 (48%)	17 (52%)				
Age	24.55 (3.38)	22.70 (4.80)	1.78	53.57	.081	.44
Education	11.81 (.87)	11.73 (.63)	.42	62	.677	.12

Note: For gender, frequency values are noted with proportion of participants in each condition provided in brackets. For Age and Education, mean values are shown with standard deviation (SD) values provided in brackets.

All participants were regular alcohol consumers as determined by responses on a Timeline Follow-Back task (*TLFB*; Sobell, Sobell, Klajner, Pavan, & Basian, 1986), were fluent in their ability to read and speak English, had completed Year 10 or equivalent, had normal or corrected-to-normal vision, and had a Body Mass Index (BMI) between 18.5 and 29.9. Participants were excluded if they had a history of a neurological condition (e.g., epilepsy, traumatic brain injury, and stroke); had a current diagnosis of a significant physical condition; had a current diagnosis of a psychiatric disorder or a score of 30 or higher on the Kessler Psychological Distress Scale (*K10*; Kessler et al., 2002); were regular tobacco smokers (one or more cigarettes daily); had used illicit drugs in the preceding six months; were currently using medicinal or recreational prescription medication (excluding contraceptive medication); had been involved in a drug study in the preceding three months; and had a history of alcohol or drug dependence or abuse disorder or use of alcohol at

hazardous levels, determined by a score of 16 or higher on the Alcohol Use Disorders Identification Test (*AUDIT*; Saunders, Aasland, Babor, De la Fuente, & Grant, 1993). Ninety-six individuals completed the online eligibility assessments, however, 32 of these were excluded because they did not meet the inclusion and exclusion criteria.

Materials

Screening Assessments

Alcohol Use Disorders Identification Test (*AUDIT;* Saunders et al., 1993). The AUDIT was developed by the World Health Organisation to detect risky, harmful or hazardous patterns of drinking. The AUDIT consists of ten questions each relating to one of three domains: alcohol consumption, drinking behaviours and dependence, and alcohol related problems. Each question is scored from zero to four, which are added together to give a maximum score of 40. An example item is 'how often during the last year have you had a feeling of guilt or remorse after drinking?' Scores above eight indicate a likelihood of hazardous or harmful alcohol consumption. However, because eligibility required experience with alcohol intoxication, participants with a score of 16 or above were excluded. The AUDIT has excellent internal consistency (Cronbach's $\alpha = .94$), as assessed among individuals from a Psychosocial Care Centre for Alcohol and Drugs (Meneses-Gaya et al., 2010).

Kessler Psychological Distress Scale (*K10;* Kessler et al., 2002). The K10 is a 10-item self-report questionnaire designed to assess levels of psychological distress, based on feelings experienced in the preceding 30 days (e.g., "During the last 30 days, about how often did you feel nervous?"). Participants rated the extent of their feelings on a 5-point Likert type scale, with response options ranging from 1 = 'None of the time' to 5 = 'All of the time'. Scores for each item were summed to

give a total "psychological distress" score, with a maximum score of 50. Participants with scores greater than 30 (i.e. which indicate high levels of distress) were excluded from the study. The K10 has good internal consistency (Cronbach's α = .84), as determined by assessments of individuals with an alcohol-related disorder (Arnaud et al., 2010).

Timeline Follow-Back (*TLFB;* Sobell et al., 1986). The TLFB is a measure of daily alcohol consumption over the preceding month. The TLFB was used to screen for drinking behaviour, ensuring participants had consumed at least two standard drinks on one occasion within the past month (to ensure participants had prior exposure to alcohol), and had not consumed alcohol in the 24 hours preceding the experimental session. Participants were presented with a calendar and asked to indicate the days where alcohol was consumed and the number of standard drinks consumed on each day. Easy to understand guidelines on the number of standard drinks contained in different types of alcoholic beverages were provided to participants. The TLFB has been used in prior alcohol intoxication studies to assess recent alcohol consumption behaviours (Fals-Stewart, 2003; Sobell et al., 1986).

Manipulation Checking

Beverage Rating Scale (*BRS*; Fillmore & Vogel-Sprott, 2000). The BRS was administered at the conclusion of the experimental session to determine participants' perceived levels of intoxication. Participants were provided with a scale ranging from zero to 10 bottles of beer (each containing 4.8% alcohol), increasing in 0.5 bottle increments. Participants were required to outline their perceived peak level of intoxication by indicating how many standard drinks they believed they had consumed during the experimental session. This scale was useful in ascertaining whether participants who received a placebo beverage were able to detect that they

had not consumed alcohol. The BRS has been used in prior alcohol intoxication studies as a manipulation check (Fillmore & Vogel-Sprott, 1999).

Biphasic Alcohol Affects Scale (*BAES*; Martin, Earleywine, Musty, Perrine, & Swift, 1993). The BAES is a self-report measure assessing the subjective effects of alcohol consumption. Participants rate the degree to which they experience seven *stimulant* (e.g., 'vigorous' and 'elated') and seven *sedative* (e.g., 'heavy headed' and 'sluggish') feelings on an 11-point Likert type scale, with response options ranging from 0 = 'not at all' to 10 = 'extremely'. Responses are summed, resulting in total stimulant and sedative subscale scores. Higher scores indicate greater stimulation and sedation. The BAES demonstrates high internal consistency of items for the stimulant and sedative subscales (Cronbach's α = .94 and .87, respectively), as determined through assessments on a sample of students with experience of alcohol consumption.

Baseline Assessments

Social Emotional Questionnaire (*SEQ*; Bramham, Morris, Hornak, Bullock, & Polkey, 2009). An adapted version of the SEQ was used to assess pre-morbid levels of social cognitive functioning. The scale comprises five subscales including emotion recognition (5 items), empathy (5 items), social conformity (3 items), antisocial behaviour (4 items), and sociability (7 items). Participants are asked to rate the extent to which they agree with statements (e.g., 'when others are happy, I am pleased for them') on a 5-point Likert type scale, with response options ranging from 1 = 'strongly disagree' to 5 = 'strongly agree'. Scores are summed, yielding a total score for each of the five subscales. The SEQ demonstrates acceptable internal consistency (Cronbach's α = .69) for the overall scale, and the subscales demonstrate adequate construct validity as ascertained through factor analysis (Bramham et al.,

2009).

Advanced Clinical Solutions (ACS) Affect Naming (Pearson, 2009). Participants are shown 24 coloured pictures of faces expressing six basic emotions (happy, sad, angry, afraid, surprised, disgusted) and an additional 'neutral' expression. Participants are required to identify the emotion from a list of the seven 'emotions' presented on a card. A total score is derived by summing all correctly labelled items. Possible scores range from 0 to 24. The ACS affect naming task has been validated in various clinical populations, including abstinent alcoholic individuals (Valmas, Mosher Ruiz, Gansler, Sawyer, & Oscar-Berman, 2014), supporting its utility as a reliable measure of social cognitive functioning.

Experimental Tasks

Emotion Recognition Task (*ERT*; Montagne, Kessels, De Haan, & Perrett, 2007). The ERT measures an individuals' ability to recognise facial expressions of morphed videos of the six basic emotions (happy, sad, surprise, angry, disgust, and fear). Two male and two female Caucasian faces, each displaying all of the six emotions, are equally featured in the stimuli. Emotions are presented at varying intensity levels, ranging from 20% to 100% in 20% increments. There were four morphed videos displayed for each emotion at each intensity level. There were 120 items in total.

The morphed videos contain images of emotions emerging from a neutral expression, the duration of which ranged from 0.31 milliseconds for the 20% intensity emotions to 1.3 seconds for the 100% intensity emotions. The morphed emotion videos are preprogramed (in a predefined random order) to be displayed in 20% increments starting from a 20% intensity level. A six alternative forced-choice response format (comprising the six listed emotions) is used for each of the 120

expressions with participants required to select the emotion that most closely corresponds with the emotional facial expression. When selecting responses for this study, participants were also asked to verbally rate their level of confidence in correctly identifying the emotional facial expression. Specifically, they were asked "on a scale from zero to 100 how confident are you that you correctly identified the emotion?". To ensure familiarity with the task, participants completed three practice trials, at which point the researcher assisted them if they did not understand the procedure.

Procedure

Prospective participants completed eligibility screening assessments, delivered via SONA. A follow-up screening interview (see Appendix C) was conducted via telephone to confirm eligibility and to arrange a mutual time for the experimental session. Information gathered at screening included basic demographic information, current height and weight, relevant medical history, and information pertaining to whether at least two standard alcoholic beverages had been consumed within the preceding month. The AUDIT (Saunders et al., 1993) and K10 (Kessler et al., 2002) were also completed at screening. Prior to participating, participants were asked to abstain from food for four hours, caffeine for eight hours, over the counter medication and alcohol for 24 hours, nicotine and illicit drugs for the duration of participation, and consent to be administered alcohol. Participants were also asked to consume a light meal absent of high fat or dairy products prior to fasting and to limit their water consumption four hours prior to the experimental session. To account for individual differences in metabolic rate, participants were asked to consume two slices of toast with their choice of spread one hour prior to participation. Toast was made available by the researcher if the participant did not have access to appropriate

facilities.

Participants were provided with an information sheet (see Appendix D) and written informed consent was obtained prior to participation (see Appendix E). Upon arrival, participants were weighed and their height measured to ensure they met eligibility requirements concerning BMI and to calculate a required dosage of alcohol. A breath alcohol concentration (BrAC) reading was taken using a Lion Alcolmeter 400+ Breathalyser to ensure participants had not consumed alcohol. The Timeline Followback was then completed to ensure compliance with eligibility requirements. All participants were then administered a 100ml placebo beverage containing soda water, Angostura® bitters and lime syrup. Three ml of Smirnoff Red Label No. 21 vodka was floated on top of the beverage and a light mist of vodka was sprayed around the inside edge of the cup to create an alcohol scent. This initial administration of a placebo beverage was designed to control for alcohol expectancy effects when completing baseline assessment tasks which were administered to ensure there were no pre-existing differences in social functioning across experimental conditions. These baseline tasks included the SEQ (Bramham et al., 2009) and the ACS Affect Naming task (Pearson, 2009).

After completing baseline tasks, participants were administered either a 750ml placebo beverage or a 750ml alcoholic beverage. The Widmark equation (see Appendix F; Dry, Burns, Nettelbeck, Farquharson, & White, 2012) was used to calculate an alcohol dosage based on participants' BMI, allowing a peak BrAC reading of .08% to be reached. Ninety ml's of lime syrup and 4ml's of Angostura® aromatic bitters were added to both beverages to mask smell and taste. Although Angostura® aromatic bitters contains 44.7% alcohol by volume, previous research has indicated that it is not sufficient to affect BrAC readings (Loeber & Duka, 2009).

Participants were given 10 minutes to consume the beverage at a steady pace and were asked not to hold it in their mouth for longer than five seconds. Participants were allowed to drink no more than 250ml of still water throughout the experimental session. Following beverage consumption, participants were placed in a separate room where they viewed a neutral video (David Attenborough's Great Barrier Reef) while the alcohol was being absorbed. Participants were asked to refrain from engaging in other activities (i.e., mobile phone use) during this absorption period.

Fifty minutes following beverage consumption a BrAC reading was obtained, at which point BrAC was expected to be at .08%. Participants then completed a Biphasic Alcohol Effects Scale (Martin et al., 1993) to check that the manipulation was effective before completing the Emotion Recognition Task (Montagne et al., 2007). Following this, they completed an additional Biphasic Alcohol Effects Scale, and the Beverage Rating Scale (Fillmore & Vogel-Sprott, 2000).

After the conclusion of the experimental procedure, participants were provided with entertainment, food, and water. Participants holding their full licence were required to remain with the researcher until two consecutive BrAC readings of .03% (.00% if the participant had a Provisional licence and were intending to drive), measured 15 minutes apart, were recorded. Alternatively, participants were given the option of being escorted by a nominated guardian to their place of residence and accompanied for two hours following session completion.

Statistical Analyses

All statistical analyses were conducted using IBM SPSS Statistics Version 23. Independent samples *t*-tests were conducted to identify any significant differences between conditions on eligibility and baseline assessments. A 2 (condition: alcohol and placebo) × 3 (time: baseline, time one, and time two) × 2

(subscale: sedative and stimulant) mixed linear models full information maximum likelihood (FIML) analysis (using syntax developed by Enders, 2011) was conducted to examine differences between conditions on the BAES. A 2 (condition: alcohol and placebo) × 5 (intensity: 20%, 40%, 60%, 80%, and 100%) × 6 (emotion: happy, surprise, fear, anger, disgust, and sadness) mixed linear models FIML analysis was also conducted to identify any significant differences between conditions on emotion perception accuracy. Alpha levels were maintained at $\alpha = .05$ for eligibility and baseline analyses. However, a more conservative alpha level of .01 was used when examining emotion perception accuracy to control for Type I error rate. Effect sizes were interpreted in the context of Cohen's *d* values, with .20 indicative of a small effect, .50 a moderate effect, and .80 a large effect (Cohen, 1992).

Assumptions for all analyses were checked. Where the homogeneity of variance assumption was violated for the *t*-tests, the equal variances not assumed statistics were reported. Due to non-normal positively skewed distributions, an inverse transformation was performed on the Calibration and ANDI statistics and a square root transformation was performed on the BAES. These transformations normalised the data, however did not impact the results. Therefore, for ease of interpretation all results presented in this paper were based on the raw data.

Analysis of Emotion Perception Accuracy. The current study conducted Calibration analyses to assess the relationship between confidence ratings and accuracy for the ERT items. Calibration refers to the match between objective (accuracy) and subjective (confidence) probabilities of an event occurring, and can be assessed by calculating Calibration, over/under confidence (O/U), and resolution values (Weber & Brewer, 2004). Perfect Calibration occurs when the proportion of correct responses is equal to the attributed confidence judgements (e.g., items that

receive 60% confidence are accurately identified 60% of the time) (Yaniv, Yates, & Smith, 1991). The Calibration statistic, with values ranging from 0 (perfect Calibration) to 1 (worst possible Calibration), provides an indication of the extent to which the relationship between accurate identifications of emotion and confidence ratings deviates from optimum Calibration (Brewer & Wells, 2006). The *O/U* statistic provides an indication of individuals' tendencies to over- or under-estimate their accuracy abilities. Values for this statistic range from -1 (complete under-confidence) to +1 (complete confidence), and is derived by calculating the difference between mean confidence and mean accuracy. Assessment of resolution or discrimination can also be obtained. Resolution refers to an individual's capacity to discriminate between the probability of an event occurring (correct recognition) and the probability of an event not occurring (incorrect recognition) (Howie & Roebers, 2007; Yaniv et al., 1991). Resolution can be expressed using the Adjusted Normalised Discrimination Index (ANDI) which ranges from 0 (no discrimination) to 1 (perfect discrimination) (Palmer, Brewer, Weber, & Nagesh, 2013).

The accuracy of confidence ratings for this study was assessed by examining the departure of confidence ratings from optimal Calibration (Calibration and *O/U* statistics) and their ability to discriminate between correctly and incorrectly recognised items (ANDI). It is important to note that each of these statistics offers unique and distinct information. In particular, perfect Calibration is not indicative of perfect discrimination, and poor Calibration is not indicative of poor discrimination (Yaniv et al., 1991).

Results

Eligibility and Baseline Assessments

Independent samples *t*-tests were conducted to ascertain whether there were differences between conditions on eligibility and baseline assessments. These analyses indicated no significant differences between conditions on the K10, AUDIT, TLFB, affect naming, and for the five subscales of the SEQ (see Table 2 for descriptive and inferential statistics).

Manipulation Checks

An independent samples *t*-test was conducted to determine whether there were differences between conditions in reported levels of perceived intoxication. This analysis indicated that participants in the alcohol condition (M = 4.40, SD = 1.12) reported consuming a greater number of standard drinks compared to participants in the placebo condition (M = 1.49, SD = 1.31), $t(62) = 9.61$, $p < .001$, $d = 2.39$.

For the BAES, a linear mixed models analysis was conducted to determine whether reported levels of stimulation and sedation differed between conditions. This analysis revealed a significant 2 (condition: alcohol and placebo) × 3 (time: baseline, Time 2, and Time 3) × 2 (subscale: sedative and stimulant) interaction, $F(4, 320) = 8.58$, $p < .001$, $r = .16$. The results of this analysis are diagrammatically represented in Figure 2. Post-hoc pairwise comparisons indicated no significant differences between conditions on the sedative, [$F(1, 189.24) = .28$, $p = .595$, $d = .13$], or stimulant, [$F(1, 189.24) = .01$, $p = .943$, $d = .02$] subscales at baseline. At Time 2, participants in the alcohol condition reported significantly greater sedation [$F(1, 189.24) = 5.92$, $p = .016$, $d = .61$] and stimulation [$F(1, 189.24) = 7.07$, $p = .009$, $d = .67$], relative to those in the placebo condition. Finally, at Time 3, participants in the

alcohol condition reported significantly greater sedation than participants in the placebo condition [$F(1, 189.24) = 7.15$, $p = .008$, $d = .67$], however, there were no differences detected between conditions in reported stimulation [$F(1, 189.24) = 2.42$, $p = .121$, $d = .39$].

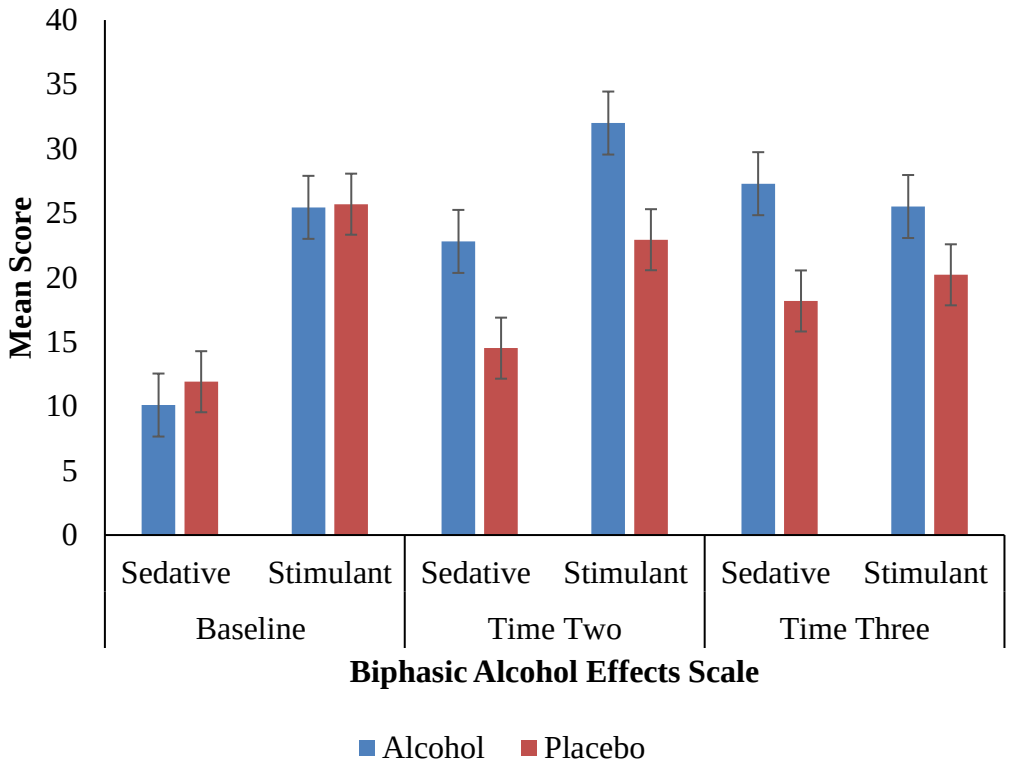

Figure 2. Means and standard errors representing sedative and stimulant effects of alcohol at three time points for alcohol-intoxicated and placebo conditions.

Table 2

Descriptive and Inferential Statistics for Eligibility and Baseline Assessments

	Alcohol			Placebo					
		95% CI			95% CI				
	M (*SD*)	*LL*	*UL*	*M* (*SD*)	*LL*	*UL*	*t*(62)	*p*	Cohen's *d*
K10	13.94 (3.47)	12.66	15.21	14.21 (3.09)	13.12	15.31	-0.34	.737	.08
AUDIT	6.65 (3.62)	5.32	7.97	5.70 (3.20)	4.56	6.83	1.11	.270	.28
TLFB	19.04 (17.0)	12.80	25.27	16.79 (15.14)	11.42	22.16	0.56	.577	.14
ACS Affect Naming	18.39 (2.29)	17.55	19.23	18.27 (2.30)	17.46	19.09	0.20	.843	.05
SEQ									
Emotion Recognition	21.32 (2.47)	20.42	22.23	21.03 (2.57)	20.12	21.94	.46	.644	.12
Empathy	19.07 (3.15)	17.91	20.22	19.91 (2.38)	19.07	20.75	-1.22	.229	.30
Social Conformity	12.68 (1.30)	12.20	13.16	12.55 (1.50)	12.01	13.08	.38	.709	.09
Antisocial Behaviour	12.16 (2.12)	11.39	12.94	12.58 (1.58)	12.02	13.14	-.89	.376	.23
Sociability	22.42 (4.63)	20.72	24.12	23.52 (2.32)	22.69	24.34	-1.21	.232	.30

Note. K10 = Kessler Psychological Distress Scale; AUDIT = Alcohol Use Disorders Identification Test; TLFB = Timeline Followback; ACS = Advanced Clinical Solutions; SEQ = Social Emotional Questionnaire; CI = confidence interval; *LL* = lower limit, *UL* = upper limit.

BrAC Readings

Immediately prior to completing the ERT, participants in the alcohol condition recorded a mean BrAC of .077 (*SD* = .02). A one-samples *t*-test indicated that this value was significantly different from zero, $t(30) = 22.52$, $p < .001$, 95% CI [.07, .08].

ERT Performance

A 2 (condition: alcohol and placebo) × 6 (emotion: happy, surprise, fear, anger, disgust, and sadness) × 5 (intensity: 20%, 40%, 60%, 80%, and 100%) linear mixed models analysis was conducted to determine whether emotion perception abilities differed between conditions and whether these abilities differed across emotions and expression intensity. This analysis indicated a significant main effect of condition, with emotion perception abilities being significantly poorer among participants in the alcohol condition compared to participants in the placebo condition [$F(1, 64) = 14.92$, $p < .001$, $r = .43$]. There was also a significant main effect of emotion [$F(5, 1856) = 479.25$, $p < .001$, $r = .45$]. Post-hoc pairwise comparisons indicated that, among all participants, emotion perception performance significantly differed for all emotions ($p < .001$). The most accurately identified emotion was happiness ($M = 3.60$, $SD = .46$) followed by anger ($M = 3.07$, $SD = .46$), disgust ($M = 2.67$, $SD = .46$), surprise ($M = 1.98$, $SD = .46$), sadness ($M = 1.36$, $SD = .46$), and fear ($M = .97$, $SD = .46$). Finally, there was a significant main effect of intensity, [$F(4, 1856) = 159.61$, $p < .001$, $r = .28$]. Post-hoc pairwise comparisons indicated that emotion perception performance significantly differed at all intensity levels at ($p < .001$), except for at 60% and 80% intensity ($p = .830$), where performance was similar. Identification performance was most accurate for

expressions that were presented at 100% intensity (*M* = 2.71, *SD* = .44), followed by 80% intensity (*M* = 2.54, *SD* = .44) and 60% intensity (*M* = 2.53, *SD* = .44), 40% intensity (*M* = 2.22, *SD* = .44), and 20% intensity (*M* = 1.37, *SD* = .44).

The linear mixed models analysis also revealed a significant two-way interaction between condition and emotion [$F(10, 1856) = 242.44$, $p < .001$, $r = .34$]. Post-hoc pairwise comparisons indicated that participants in the alcohol condition were significantly less accurate at correctly identifying fear and sadness relative to participants in the placebo condition. There was also a trend for participants in the alcohol condition to be less accurate at correctly identifying surprise ($p = .032$) (see Figure 3). A significant interaction between condition and intensity was also detected [$F(8, 1856) = 81.10$, $p < .001$, $r = .20$]. Post-hoc pairwise comparisons indicated that participants in the alcohol condition were significantly less accurate at correctly identifying emotional expressions when they were presented at 40% intensity [$F(1, 222.20) = 8.95$, $p = .003$, $r = .20$], 80% intensity [$F(1, 222.20) = 16.69$, $p < .001$, $r = .26$], and 100% intensity [$F(1, 222.20) = 9.58$, $p = .002$, $r = .20$]. There was also a trend for participants in the alcohol condition to be less accurate at correctly identifying emotional expressions presented at 60% intensity ($p = .014$) (see Figure 4). When examined separately for the alcohol and placebo conditions, identification performance for each emotion and each intensity level was consistent with that reported for the main effects.

There was also a 2 (condition: alcohol and placebo) × 6 (emotion: happy, surprise, fear, anger, disgust, and sadness) × 5 (intensity: 20%, 40%, 60%, 80%, and 100%) interaction [$F(40, 1856) = 4.02$, $p < .001$, $r = .05$]. The results of this analysis are diagrammatically presented in Figure 5. Post-hoc pairwise comparisons indicated that participants in the alcohol condition were significantly less accurate than

participants in the placebo condition at correctly identifying fear at 60% intensity [$F(1, 1457.99) = 9.94$, $p = .002$, $d = 0.86$], 80% intensity [$F(1, 1457. 99) = 10.78$, $p = .001$, $d = 0.83$], and 100% intensity [$F(1, 1457.99) = 7.57$, $p = .006$, $d = 0.69$]. They were also significantly less accurate at identifying sadness at 60% intensity [$F(1, 1457.99) = 12.83$, $p < .001$, $d = 0.90$], 80% intensity [$F(1, 1457.99) = 25.52$, $p < .001$, $d = 1.27$], and 100% intensity [$F(1, 1457.99) = 21.70$, $p < .001$, $d = 1.17$]. There was also a trend for participants in the alcohol condition to be less accurate at correctly identifying anger, relative to participants in the placebo condition, when presented at 80% intensity [$F(1, 1457.99) = 4.46$, $p = .035$, $d = .53$]. There was also a trend for participants in the alcohol condition to be less accurate at correctly identifying surprise [$F(1, 1457.99) = 3.93$, $p = .048$, $d = .50$], fear [$F(1, 1457.99) = 5.39$, $p = .020$, $d = .58$], and sadness [$F(1, 1457.99) = 4.22$, $p = .040$, $d = .52$] at 40% intensity, relative to participants in the placebo condition. No significant differences were detected between conditions on the remaining emotions/intensity levels.

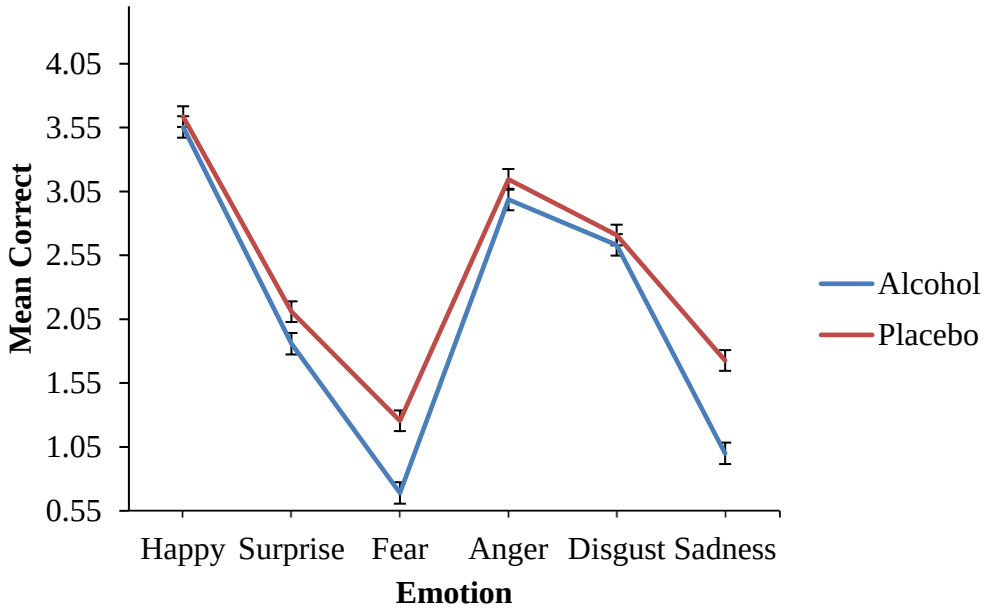

Figure 3. Means and standard errors for the two-way interaction between condition and emotion.

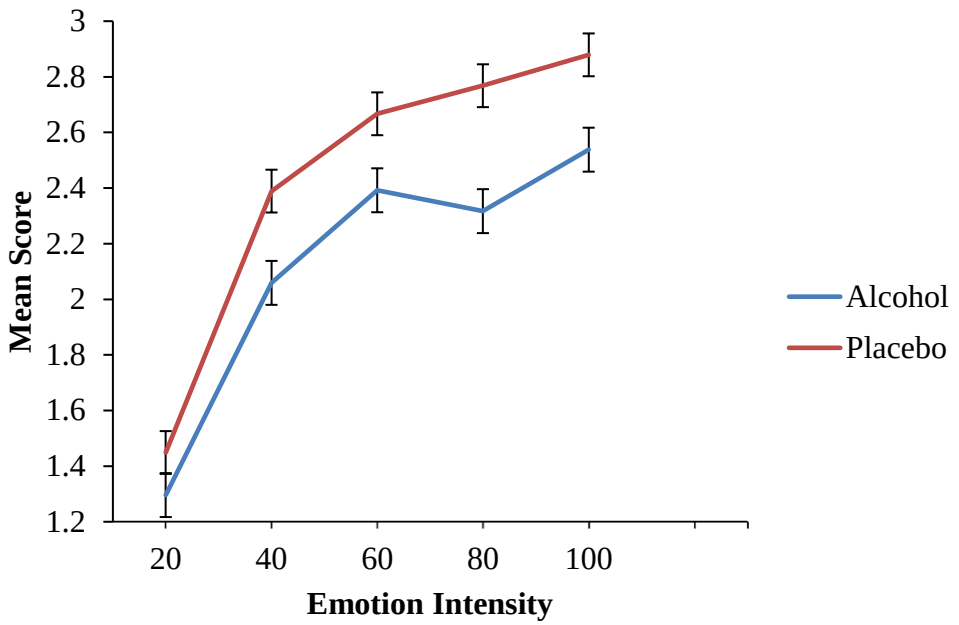

Figure 4. Means and standard errors for the two-way interaction between condition and intensity.

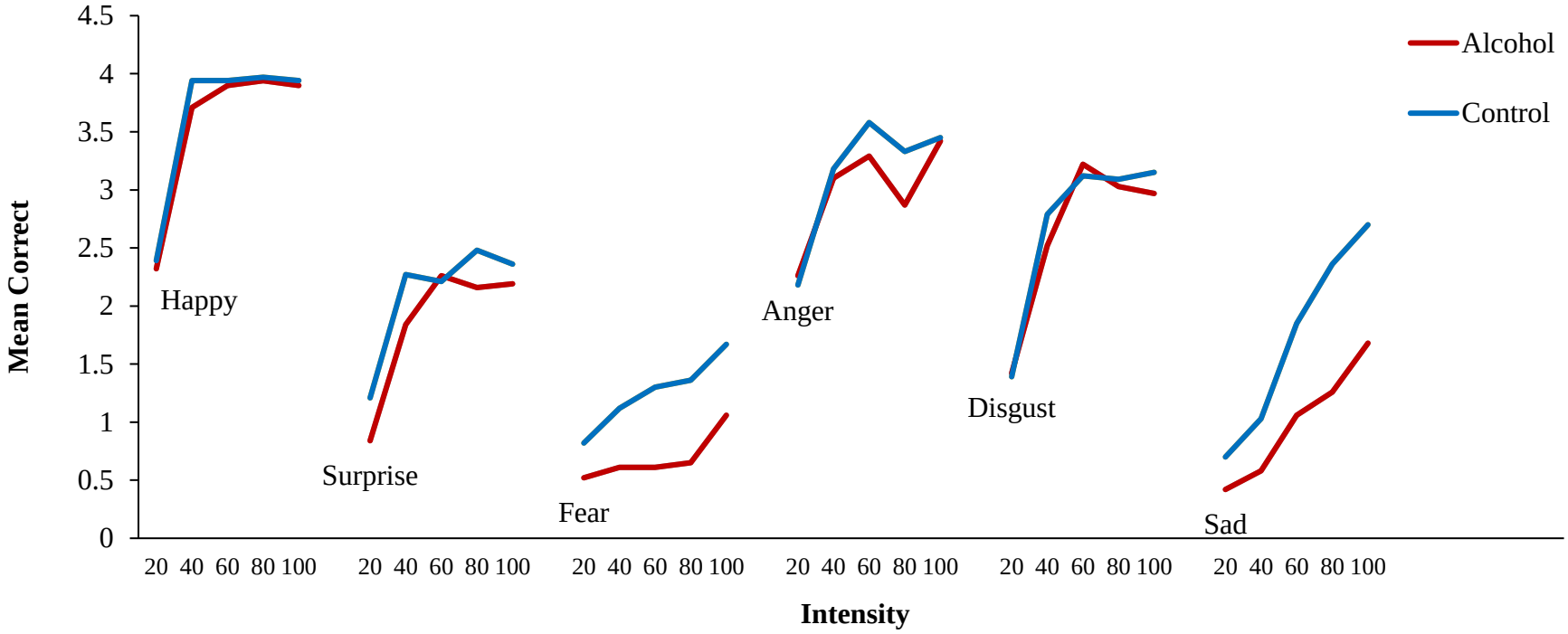

Figure 5. Mean correct identifications of six basic emotions across five intensity levels in alcohol-intoxicated and control participants.

Calibration Analyses

Accuracy of Confidence Ratings. One-samples *t*-tests were conducted to determine the accuracy of confidence ratings amongst the total sample. The ANDI values for the alcohol (M = .15, SD = .22) and placebo (M = .22, SD = .29) conditions were significantly different from zero, $t(181) = 9.12$, $p < .001$, 95% CI [.12, .18] and, $t(187) = 10.70$, $p < .001$, 95% CI [.18, .26], respectively. This indicates that 15% of confidence ratings in the alcohol condition and 22% of confidence ratings in the placebo condition were able to discriminate between correctly and incorrectly recognised items. A significant *O/U* value of .18 (SD = .31) for the alcohol condition and .13 (SD = .26) for the placebo condition indicated that participants were slightly overconfident in their predictions and that these values were significantly different from zero, $t(185) = 7.80$, $p < .001$, 95% CI [.13, .22] and, $t(197) = 7.30$, $p < .001$, 95% CI [.10, .17], respectively. Lastly, a significant Calibration value for the alcohol (M = .18, SD = .17) and the placebo (M = .16, SD = .13) conditions indicated that actual performance closely corresponded with subjective ratings of performance and that these values were significantly different from zero, $t(185) = 14.49$, $p < .001$, 95% CI [.16, .21] and, $t(197) = 16.65$, $p < .001$, 95% CI [.14, .17], respectively.

Calibration Statistic. A 2 (condition: alcohol and placebo) × 6 (emotion: happy, surprise, fear, anger, disgust, and sadness) linear mixed models analysis was conducted to ascertain the match between actual performance and subjective ratings of performance according to the calculated Calibration statistic values (the dependent variable). This analysis indicated a non-significant main effect of condition, [$F(1, 64) = 3.12$, $p = .082$, $r = .22$]. However, there was a significant main effect of emotion, [$F(5, 320) = 74.30$, $p < .001$, $r = .19$]. This main effect is diagrammatically

represented in Figure 6. Post-hoc pairwise comparisons indicated that, among all participants, fear, sadness, and surprise significantly differed from each other as well as from all other emotions ($p < .01$). There was also a trend for happy and disgust to differ from each other ($p < .05$). There was a non-significant condition by emotion interaction, [$F(5, 320) = .95$, $p = .447$, $r = .05$].

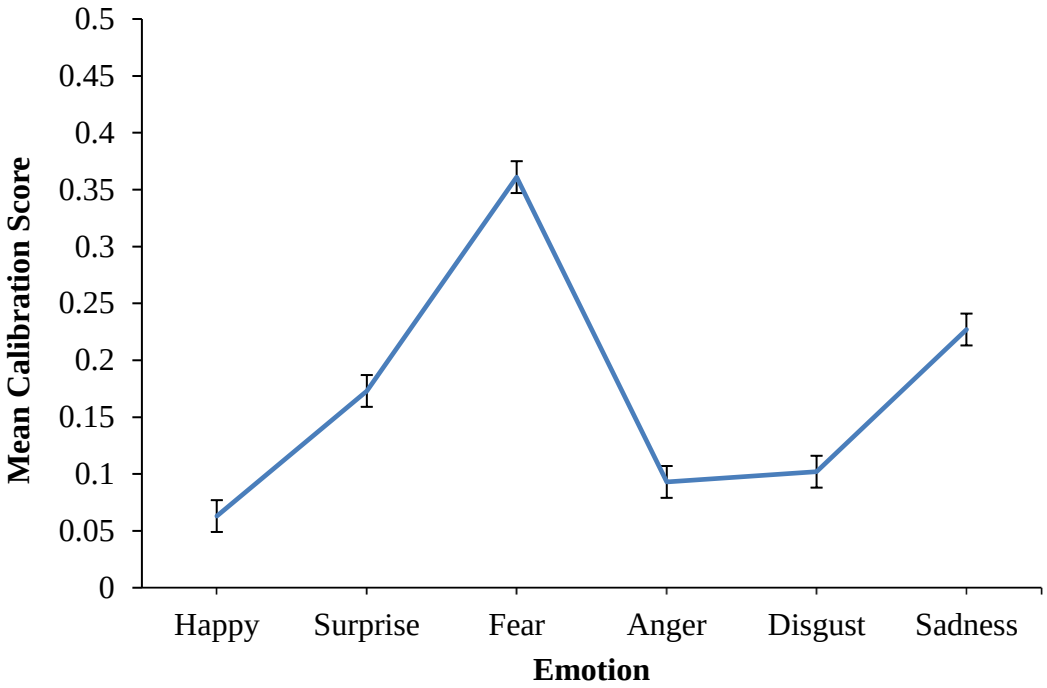

Figure 6. Means and standard errors for the Calibration statistic across all participants for each emotion.

ANDI Statistic. A 2 (condition: alcohol and placebo) × 6 (emotion: happy, surprise, fear, anger, disgust, and sadness) linear mixed models analysis was conducted to ascertain condition differences in the ability to discriminate between correctly recognised and incorrectly recognised emotions according to the calculated ANDI statistic. The results of this analysis is diagrammatically represented in Figure

7. This analysis indicated a significant main effect of condition, [$F(1, 57.86) = 12.30$, $p = .001$, $r = .42$], with confidence ratings predicting 23% ($SD = .13$) of correct identifications in the placebo condition and 15% ($SD = .13$) of correct identifications in the alcohol condition. There was also a significant main effect of emotion, [$F(5, 304.14) = 29.30$, $p < .001$]. Post-hoc pairwise comparisons indicated that the ANDI value for happiness was significantly higher than all other emotions at $p < .001$. A significant condition by emotion interaction was not detected, [$F(5, 304.14) = 1.25$, $p = .286$, $r = .06$].

O/U Statistic. A 2 (condition: alcohol and placebo) × 6 (emotion: happy, surprise, fear, anger, disgust, and sadness) linear mixed models analysis was conducted to ascertain differences between conditions in self-reported confidence to correctly identify emotions. There was not a significant condition by emotion interaction, $F(5, 320) = .37$, $p = .868$, $r = .03$. There was also no significant main effect of condition, $F(1, 64) = 1.04$, $p = .311$, $r = .13$. However, there was a significant main effect of emotion, $F(5, 320) = 125.83$, $p < .001$, $r = .53$. The results of this main effect are diagrammatically represented in Figure 8. Post-hoc pairwise comparisons indicated that all emotions were significantly different from one another at $p < .001$, except for between anger and happiness and sadness and surprise where there was a trending difference at $p < .05$.

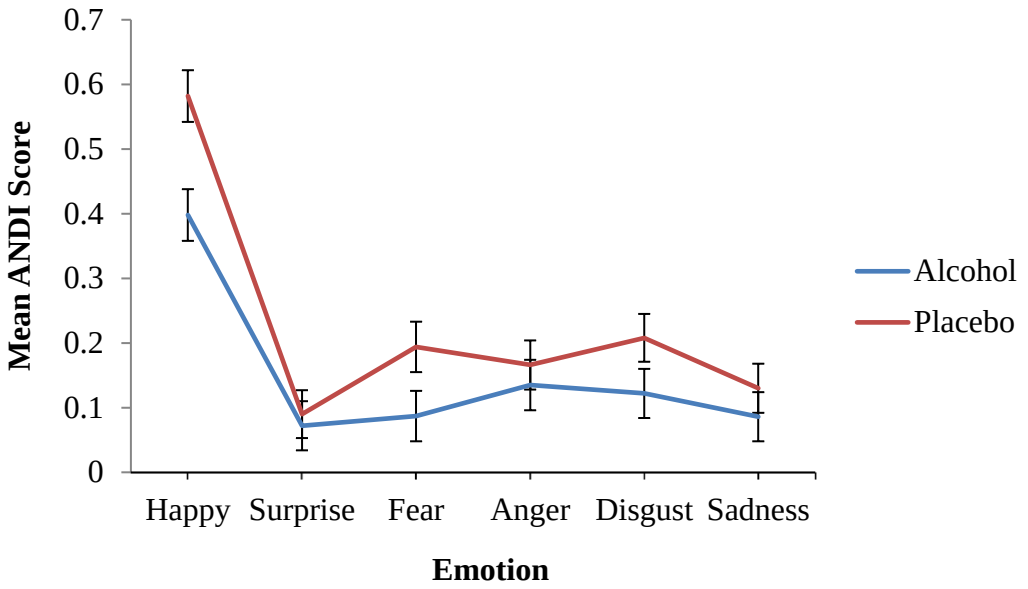

Figure 7. Means and standard errors for the ANDI statistic across all participants for each emotion.

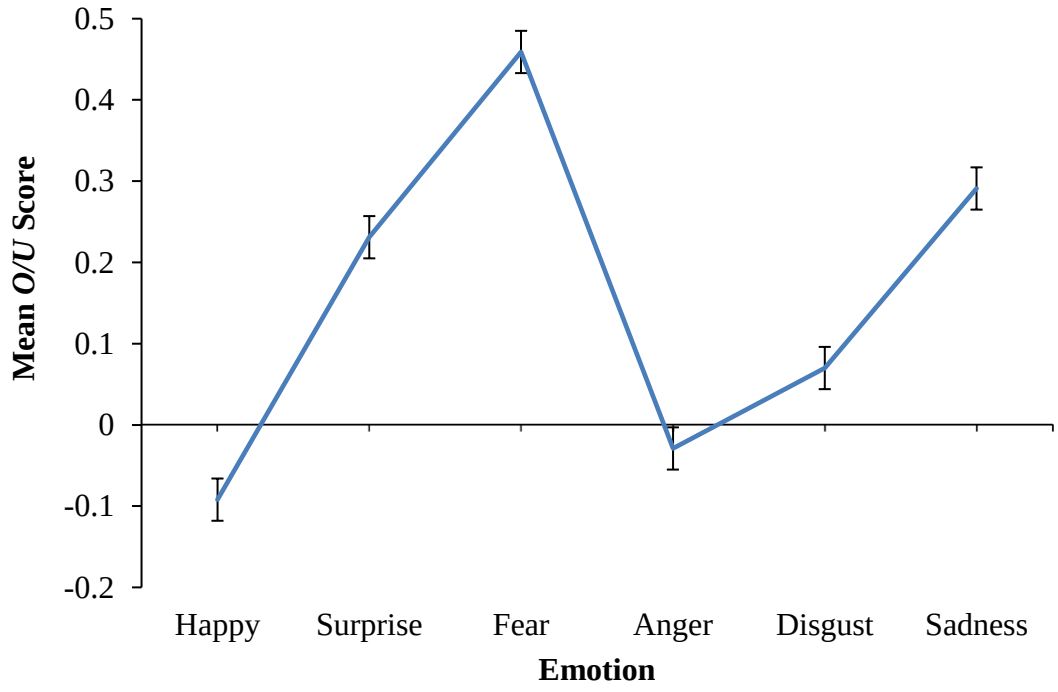

Figure 8. Means and standard errors for the *O/U* statistic across all participants for each emotion.

Discussion

The current study aimed to investigate the effects of alcohol intoxication on abilities to perceive a full range of basic emotions (happy, surprise, fear, anger, disgust, and sad) across varying intensity levels. In addition, the study aimed to assess participants' insight into their emotion perception abilities. All manipulation checks employed in the current study functioned as intended and there were no significant differences between conditions on baseline assessments. Therefore, the present results can be interpreted with confidence.

The first hypothesis, that alcohol-intoxicated individuals will have greater difficulties in correctly labelling negative, but not positive emotional expressions than non-intoxicated individuals when emotions are displayed at high intensity levels, was supported. Consistent with the hypothesis, emotion perception abilities were significantly more accurate among individuals in the placebo condition than those in the alcohol condition, regardless of emotion type and expression intensity. Furthermore, while individuals in the alcohol-intoxication condition did not differ from individuals in the placebo condition for positive emotions, they were significantly less accurate at correctly identifying fear and sadness. There was also a trend towards poorer performance for the perception of anger for alcohol-intoxicated individuals ($p = .035$).

The second hypothesis, that alcohol-intoxicated individuals will have greater difficulties in correctly labelling emotional expressions when they are displayed at lower (i.e., 20% - 60%) intensity levels regardless of emotional valence than non-intoxicated individuals, was partially supported. Overall, alcohol-intoxicated individuals performed more poorly across all emotion types at 40%, 80% and 100%

intensities, with a trend of poorer performance at 60% intensity (p = .014). Specific to fear and sadness, however, alcohol-intoxicated individuals were significantly less accurate at correctly identifying emotions, but only at high intensity levels (i.e., 60%, 80%, and 100%) relative to non-intoxicated individuals. There was also a trend for alcohol intoxicated individuals to be less accurate at correctly identifying anger at 80% intensity (p = .035) compared to non-intoxicated individuals. A trend for being less accurate at correctly identifying surprise (p = .020) for the alcohol-intoxicated individuals was also detected.

These findings significantly add to the existing literature on emotion perception abilities in alcohol intoxicated individuals. Most prior studies in examining emotion perception abilities in alcohol intoxicated individuals have yielded total accuracy scores or have employed threshold emotion detection techniques, whereby participants are required to indicate when they detect an emotion emerging from a neutral expression. These studies have found differing results, however this may be due to differences in methodological design. Tucker and Vuchinich (1983) found that alcohol intoxicated individuals were significantly less accurate at correctly identifying emotional expressions than non-intoxicated individuals. However, because all correct items were summed, the identification of deficits for specific emotion types was not achieved. Alternatively, Walter et al. (2011) found that alcohol intoxicated individuals were equally as effective at correctly identifying emotions as non-intoxicated individuals. However, the use of a threshold emotion detection task meant that individuals' abilities were determined by the *intensity threshold* at which they were able to identify the emergence of an emotion. The current study, however, provides evidence of the existence of emotion perception deficits among alcohol intoxicated individuals through use of an emotion

perception task that allows the assessment of emotion perception ability across a range of emotion types and emotion intensities. Importantly, unlike Walter et al. who examined only group differences at the level of intensity threshold,
the current study found that difficulties in emotion detection ability were apparent in most negative emotions at moderate-to-higher intensity levels. Thus, the emotion perception difficulties of alcohol-intoxicated individuals appear to be more widespread than the difficulties that may or may not be detected in these prior studies.

The present findings are consistent with the findings of Philippot et al. (1999), who examined emotion perception abilities in alcohol dependent individuals. Specifically, this study found that alcohol dependent individuals were significantly less accurate at correctly identifying sad, disgust, angry, and happy emotional expressions at all intensity levels. Alcohol dependent individuals were also significantly worse at correctly identifying fear when presented at 70% and 100% intensity. While the existence of emotion perception deficits for negative stimuli were consistent with Philippot et al.'s (1999) findings, deficits in detecting emotions such as happy, were not consistent. One possible explanation for this is that Philippot et al. employed static photographs to assess emotion perception abilities, which arguably may not reflect the dynamic nature of emotional expressions in humans. In particular, as these facial configurations do not allow a participant to see an emotion *emerge* in real time (e.g., from a neutral stimulus in the form of a video clip as used in the present study), it may be less detectable, potentially resulting in a greater number of incorrect identifications. An alternative and highly plausible explanation is that areas of the brain that mediate positive emotions are compromised in alcohol dependent individuals, but not alcohol intoxicated individuals. That is, emotional

valence is mediated by differing regions of the brain. In line with this, prior studies using electroencephalograms have found more activation in the left hemisphere of the frontal lobes during videotaped segments that were perceived by participants as positive, than segments perceived as negative (Davidson, 1992; Davidson & Fox, 1982). The right hemisphere was more likely to be activated in the negative segments. In alternative research, cerebellar lesions have been linked with reduced pleasant experience in response to happiness- but not fear-evoking stimuli in individuals with stroke (Turner et al., 2007). The notion that alcohol consumption is a social lubricant when taken acutely and in moderate doses, thereby facilitating positive social interaction, is consistent with a valence model that specifies there are specialised regions of the brain mediating positive vs. negative emotion types (Hellige, 1993).

These results are inconsistent with those reported by Kornreich et al. (2001) who found that abstainers and recently detoxified individuals were significantly less accurate at correctly identifying emotional expressions at low intensity levels relative to controls. Deficits in emotion perception at low intensity levels have also been found in individuals with a TBI, particularly for stimuli depicting anger, disgust, and happy expressions (Rosenberg et al., 2014). The deficits identified in these clinical populations may be attributed to brain injury severity or long term neurological changes as a result of chronic alcohol consumption. In this way, it is reasonable to expect that deficits were not identified in the current study because acute alcohol consumption does not impact brain functionality to the same extent of chronic alcohol use and TBI.

The more extensive emotion perception deficits detected in the alcohol dependent individuals may also be the consequence of cognitive and perceptual

dysfunctions commonly seen in these individuals (Kornreich et al., 2001). These include deficits in memory, perceptual analysis, speed and accuracy of information processing, and learning (Parsons, 1998). The severity and impact of these dysfunctions are also likely influenced by the rate and extent of recovery from chronic alcohol use. That is, certain brain regions are particularly sensitive to the effects of chronic alcohol exposure, and recovery of these regions may take longer. This may explain why individuals who had abstained from alcohol for two months in Kornreich et al. (2001) study, were more accurate at correctly identifying emotions than those who had recently detoxified. Increases in accurate identifications following longer abstinence period would be unsurprising and may be more closely related to the results observed in the current alcohol intoxicated sample.

The trending significance between groups in surprise is an interesting finding of the study. Previous research has illustrated that, while surprise is often conceptualised as being a positive emotion (Babbage et al., 2011), it has also been regarded as an emotion without a clear valence (Kreibig, 2010). A study conducted by Rosenberg et al. (2014) examining emotion perception performance among individuals with a TBI found that expressions depicting surprise and fear were commonly confused among both the TBI and control groups. This confusion is unsurprising given the similar facial configurations of the two emotions (e.g., an open mouth and raised eyebrows) (Honan, McDonald, Sufani, Hine, & Kumfor, 2016). Thus, it is possible that surprise in this study lacked clear valance. It would be interesting in a future study to ascertain where misclassifications across the emotion types might have occurred in alcohol intoxicated individuals.

The third hypothesis, that alcohol-intoxicated individuals will demonstrate a greater lack of insight into their emotion perception abilities when compared to non-

intoxicated individuals, was supported. Overall, alcohol intoxicated individuals displayed poorer insight into their emotion perception abilities relative to non-intoxicated individuals. Although it was interesting that across all participants confidence ratings were significantly more predictive of correct identifications for happy expressions than for all other emotional expressions.

These findings are consistent with prior findings reported by Kornreich et al. (2001) that both abstainers and recently detoxified individuals displayed little insight into their emotion perception deficits relative to control participants. However, the present findings are also the first to demonstrate that alcohol intoxicated individuals have impaired insight into their emotion perception ability. The results of the current study, therefore, contribute important information to the literature on alcohol intoxication, demonstrating that acute alcohol consumption has a considerable effect on individuals' abilities to identify their emotion perception deficits.

Insight into performance is adaptive, in that it allows individuals to alter their behaviour when responding to the environment (Toglia & Kirk, 2000). Inaccurate self-monitoring and overestimation of capabilities can be problematic. For example, poor perception of negative expressions, combined with an overestimation of perception performance, may mean that important social cues are not detected, potentially potentiating increased negative social responses. Similarly, perceptions of positive expressions, combined with inaccurate overestimation of performance, may prevent increases in desirable social responses. Given the importance of insight in mediating appropriate social behaviour, examining individuals' insight into their emotion perception abilities was an important aspect of the current study. Specifically, the examination of online awareness, which refers to the monitoring and regulation of performance throughout the completion of a task, was important. In this

way, participants' abilities to identify deficits and apply alternative strategies and responses, could be directly examined.

Limitations and Areas for Future Research

A limitation of the current study is that emotion perception was assessed in the absence of social contexts. As previously mentioned, emotions convey important non-verbal information, and the interpretation of this information is likely to be facilitated by information afforded by social and environmental contexts. Future research may examine emotion perception abilities in alcohol-intoxicated individuals when emotional expressions are presented in a variety of different contexts (e.g., at a bar).

An additional limitation of the current study is that all emotions emerged from a neutral expression. This is not reflective of the human experience of emotional display and perception. Often, individuals are interacting in complex social environments whereby the full process of an emerging expression is not in view. Therefore, future research may examine whether emotion perception deficits differ for expressions that emerge from neutral and expressions that emerge from different intensities.

Conclusion

Relationships between alcohol consumption and negative social behaviours are well established. However, the possible mechanisms underlying these behaviours are poorly understood. One possible explanation is that alcohol-intoxicated individuals are poor at recognising emotions displayed by others. Previous research examining emotion perception abilities in this population has failed to indicate whether deficits are present for select emotion types and whether these deficits are apparent at different intensity levels. Research has also failed to examine

participants' insight into their emotion perception abilities. The results of the current study, however, provide valuable insight into emotion perception performance among alcohol intoxicated individuals. Specifically, it was found that alcohol intoxicated individuals were significantly less accurate at correctly identifying negative, but not positive, emotions presented at moderate-to-high intensity levels. Alcohol-intoxicated individuals' propensity to inaccurately identify negative emotions provides a greater understanding into the possible mechanisms underlying negative social behaviours seen in this group.

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Appendix A Ethics Approval

Office of Research Services
University of Tasmania
Private Bag 1
Hobart Tasmania 7001
Telephone + 61 3 6226 7479
Facsimile + 61 3 6226 7148
Email HumanEthics@utas.edu.au
www.research.utas.edu.au/human_ethics/

HUMAN RESEARCH ETHICS COMMITTEE (TASMANIA) NETWORK

UTAS

17 May 2016

Dr Cynthia Honan
C/o- Psychology

Sent via email

Dear Dr Honan

REF NO: H0015633
TITLE: Alcohol intoxication and social cognition: an examination of perception and response to social information

Document
Application Form – NEAF
Protocol – Alcohol Study
Psychology Peer Review

The Tasmanian Health and Medical Human Research Ethics Committee considered and approved the above documentation on **10 May 2016** to be conducted at the following site(s):

University of Tasmania

Please ensure that all investigators involved with this project have cited the approved versions of the documents listed within this letter and use only these versions in conducting this research project.

This approval constitutes ethical clearance by the Health and Medical HREC. The decision and authority to commence the associated research may be dependent on factors beyond the remit of the ethics review process. For example, your research may need ethics clearance from other organisations or review by your research governance coordinator or Head of Department. It is your responsibility to find out if the approvals of other bodies or authorities are required. It is recommended that the proposed research should not commence until you have satisfied these requirements.

All committees operating under the Human Research Ethics Committee (Tasmania) Network are registered and required to comply with the *National Statement on the Ethical Conduct in Human Research* (NHMRC 2007 updated 2014).

Therefore, the Chief Investigator's responsibility is to ensure that:

(1) The individual researcher's protocol complies with the HREC approved

protocol.

(2) Modifications to the protocol do not proceed until **approval** is obtained in writing from the HREC. Please note that all requests for changes to approved documents must include a version number and date when submitted for review by the HREC.

(3) Section 5.5.3 of the National Statement states:

Researchers have a significant responsibility in monitoring approved research as they are in the best position to observe any adverse events or unexpected outcomes. They should report such events or outcomes promptly to the relevant institution/s and ethical review body/ies and take prompt steps to deal with any unexpected risks.

The appropriate forms for reporting such events in relation to clinical and non-clinical trials and innovations can be located at the website below. All adverse events must be reported regardless of whether or not the event, in your opinion, is a direct effect of the therapeutic goods being tested. http://www.utas.edu.au/research-admin/research-integrity-and-ethics-unit-rieu/human-ethics/human-research-ethics-review-process/health-and-medical-hrec/managing-your-approved-project

(4) All research participants must be provided with the current Patient Information Sheet and Consent Form, unless otherwise approved by the Committee.

(5) The Committee is notified if any investigators are added to, or cease involvement with, the project.

(6) This study has approval for four years contingent upon annual review. A *Progress Report* is to be provided on the anniversary date of your approval. Your first report is due **10 May 2017**. You will be sent a courtesy reminder closer to this due date.

(7) A *Final Report* and a copy of the published material, either in full or abstract, must be provided at the end of the project.

Should you have any queries please do not hesitate to contact me on (03) 6226 2764.

Yours sincerely

Heather Vall
Ethics Administrator
Office of Research Services
Email: Heather.vall@utas.edu.au
University of Tasmania
Private Bag 01 Hobart Tas 7001

Appendix B Participant Recruitment Flyer

UTAS

Research Volunteers Wanted

Alcohol and Social Ability Study

Are you aged between 18-35 years?

Do you have some experience with alcohol?

We are looking for healthy volunteers to participate in a study investigating the effects of alcohol on social abilities such as emotion perception.

As a participant you will be asked to complete some brief baseline assessment tasks and questionnaires, consume some beverages (which may contain alcohol), and undertake some computer-based assessment tasks. The testing should take no longer than 2 hours to complete, although you must remain with the researchers until a BrAC level of .03% is achieved (0.0% for provisional licence drivers).

To volunteer or for more information, please email launcestonalcoholstudy@gmail.com

Receive a Village Cinemas movie ticket VILLAGE CINEMAS

This study has been approved by the Tasmanian Health and Medical Human Research Ethics Committee (#H0015633)

Appendix C Follow-up Screening Interview

Introduction to the Study and Screening

I am following up your expression of interest in the research examining alcohol and social cognition. Are you still interested in participating in the research?

To give you a quick summary of the research, your participation will involve attending a one 100 minute session, however you may be required to remain with the researchers 3 hours to ensure you return to a baseline blood alcohol reading before leaving. In the session, you may or may not be administered alcohol; you won't be informed of the beverage type administered in each session until the end of your participation. You will be asked to complete some non-computer-based and computer-based tests of cognition. You will also rate your level of intoxication. Blood alcohol concentration will be measured throughout the session. KHA11/112 participants will receive 3 hours of course credit for their participation. Non-KHA111/112 participants will receive a movie ticket in appreciation of their time.

Do you have any initial questions about the research?

Do you mind if I ask you a few quick questions to check your eligibility for participating in the study? *Review the answers provided in the initial online screen. Inform the participant that all information will be kept confidential and this screening questionnaire will be securely destroyed at the conclusion of your participation.*

Specification of Study Restrictions

I would just like to ask you a few extra questions to ensure you will be able to complete the study. *(Exclude if answer no to any of the following questions).*

- Will you be able to attend one 100 minute session held within the Discipline of Psychology at the Launceston campus of the University of Tasmania and conducted between 9:00am and 7:00pm?
  Y / N
- Are you willing to remain in the laboratory until your blood alcohol concentration equals 0.03% or less on two consecutive occasions measured 15 minutes apart? This may mean being the laboratory for around 3 hours in total? **Y / N**

- Are you willing to drink up to six standard alcoholic drinks in the session? **Y / N**

- In order to ensure participants enter each experimental session with the same level of alcohol, caffeine and food in the stomach, we ask that participants abstain from food for 4 hours, caffeine for 8 hours and alcohol and over-the-counter medication for 24 hours prior to each session. We also ask that participants abstain from illicit drugs for the duration of the study. Participants are also required to eat 2 slices of toast with spread of

choice 1 hour prior to the session. This will be available from the researchers if required. Prior to fasting a light meal devoid of high fat and dairy is advised (e.g., a sandwich). Will you be willing to abstain from food, alcohol, caffeine, and illicit drugs for the specified durations? **Y / N**

Thank you for answering all the questions. Do you have any further questions about the research? (Note any concerns _____)

I will email you some information about what to do before attending an experimental sessions. I will also send you instructions and a map to assist in finding the laboratory.

Do you have any preferred days for completing the experimental session?

- □ Monday
- □ Tuesday
- □ Wednesday
- □ Thursday
- □ Friday
- □ Saturday
- □ Sunday

Do you have a time and day that would be convenient to come and complete the session?

Date: / / Time:

I will send you a reminder the day before the session. Would you prefer me to call/text/email the day before to confirm your session?

call/text/email *(circle)*

Mobile: ……

email: ……..

** Emailed pre-session instructions to the participant: YES / NO *(circle)*

Appendix D Participant Information Sheet

School of Psychology
University of Tasmania

Information Sheet

The Impact of Alcohol Consumption on Social Ability

April 2016

Introduction

You are invited to participate in an experiment examining the effect of alcohol on social ability. The research is being conducted by Miss Emma Johnson and Miss Sarah Skromanis in partial fulfilment of the requirements of an Honours degree at the University of Tasmania. Emma and Sarah are being supervised by Dr Cynthia Honan, a Clinical Neuropsychologist and Lecturer from the Discipline of Psychology, School of Medicine, University of Tasmania. The researchers can be contacted as follows: Emma Johnson (emma.johnson@utas.edu.au; Ph: 03 6324 3266); Sarah Skromanis (sarah.skromanis@utas.edu.au; Ph: 03 6324 3266); Dr Cynthia Honan (cynthia.honan@utas.edu.au; Ph: 03 6324 3266).

What is the purpose of the study?
The purpose of this study is to investigate how alcohol interferes with social ability. Emotion perception and theory of mind ability (ability to understand the thoughts and behaviours of others), and the ability to inhibit automatic social responding will be specifically examined. These abilities will be assessed using cognitive tasks.

Who can participate?
We are seeking participants who are:

- Aged 18-35 years
- Speak and read fluent English
- Completed Year 10 or equivalent
- Normal or corrected-to-normal vision
- Healthy (no history of significant neurological disorder or current psychiatric disorder, significant intellectual disorder, alcohol/drug dependence, regular tobacco use, or chronic health problems)
- Regular alcohol consumers (minimum consumption of 2 standard alcoholic drinks on one occasion in the preceding month)
- Not currently using illicit drugs (i.e. use in the past six months)

- Not taking prescription medication (contraceptive medication allowed)
- Able to attend the Newnham campus of the University of Tasmania for 3 hours between 9am and 7pm (session lengths are an estimate only).

What does participation in the study involve?
This research will be conducted in Buildings O and N at the Newnham Campus, University of Tasmania. Interested individuals will complete some online screening questionnaires that will ask for your demographic details (e.g., age, sex, education), height and weight (to calculate Body Mass Index), medical history, psychological functioning, and use of alcohol. Eligible participants will be contacted to attend the Newnham campus for an experimental session conducted between 9am and 7pm.

Experimental sessions:
At the beginning of the session participants will consume a 150ml beverage before completing questionnaires asking about alcohol intake in the previous month and current mood, and brief cognitive tasks assessing basic emotion perception and inhibition ability. Participants will then be asked to consume a 750ml beverage that will contain either a placebo or alcohol. Alcohol administered will be a maximum of 6 standard alcoholic drinks. Participants will not be informed of the beverage content administered in each session until the conclusion of the session.

After consuming the beverage, participants will be asked to complete one emotion recognition task, two computerised laboratory tasks assessing motor responses and inhibition ability, and one social disinhibition task. A breathalyser will be used to monitor participants' breath alcohol concentration throughout the duration of the study. Throughout testing, participants will also be asked to complete several scales assessing their feeling of intoxication and impairment.

While it is estimated that the experimental tasks will take approximately 100 minutes to complete, some participants may be required to remain in the laboratory for a total of 3 hours to ensure each participant records two consecutive breath alcohol readings of .03% or less (.00% for Provisional licence holders intending to drive). These times are an estimate only as individual rates of alcohol absorption and elimination may vary. Participants will be debriefed regarding the order of dose administration at the conclusion the session.

What are the restrictions regarding participating?
Participants will be asked to fast from food for 4 hours prior to each experimental session, although we ask that participants consume two slices of toast with their choice of spread 60 minutes prior to the session. Toast will be available from the researchers if required. Prior to fasting, a standard light meal devoid of high-fat or dairy products (e.g., a sandwich) is advised.

Participants will be asked to abstain from caffeine for 8 hours and alcohol and over-the-counter medication for 24 hours prior to each session. Participants will be asked to abstain from illicit drugs and tobacco for the duration of participation.

At the end of each session, participants will remain at leisure (with food and entertainment provided) until they attain two consecutive breathalyser recordings of

0.03% or less measured 15 minutes apart. Participants holding their provisional driver licence, who are intending to drive will be required to remain in the laboratory until two consecutive BrAC measurements are recorded at .00%. Participants holding their provisional licence who are not intending to drive, will be able to leave the laboratory at .03% BrAC if they sign a declaration in which they agree to be escorted by a nominated guardian to their place of residence and accompanied for a two hour period following session completion. The nominated guardian must be an adult aged 18 years or older who: (i) holds their provisional or full driver licence (ii) directly collects the participant from the research premises and meets the researcher in-person, and (iii) signs a declaration agreeing to escort the participant directly to their place of residence and accompany the participant for the two hour period following session completion. The researcher reserves the right to retain participants in the laboratory until .03% BrAC for those holding their full driver licence and .00% BrAC for those holding their provisional licence when it is deemed unsafe for the participant to leave at .03% BrAC.

What are the benefits of participating?
Your participation will help us enhance our knowledge of the effects of alcohol on social ability, and specifically, the mechanisms underlying social disinhibition, theory of mind and emotion perception. This knowledge can be used to educate people regarding the potential outcomes of alcohol intoxication on social functioning and will inform further research that aims to investigate alcohol related social difficulties.

What are the risks associated with participating?
There are no anticipated risks of this research. However, if in the unlikely event you experience negative side-effects, please inform the experimenter and the necessary assistance will be sought and provided. We ask that participants refrain from consuming alcohol or operating heavy machinery for four hours post-session.

Is there any reimbursement for participation?
Students of the University of Tasmania who are undertaking KHA111/112 unit will receive three hours of research participation credit for their time. Participants who are not undertaking KHA111/112 units will receive a Village Cinemas movie ticket as recompense for their time. Participants who do not complete the full schedule of sessions will not receive a movie ticket, unless withdrawal is necessary due to an unexpected adverse physiological reaction to the investigatory products.

How do I volunteer to participate? What if I want to withdraw from participating? Participation in this study is voluntary. By signing the attached consent form, you are indicating that you are aware of the nature of the study and wish to participate. While we would be pleased to have you participate, we respect your right to decline. There will be no consequences to you if you decide not to participate. If you decide to discontinue participation at any time, you may do so without providing an explanation. However, you will be required to remain in the laboratory until your breath alcohol concentration measurement equals 0.03% or less on two separate occasions measured 15 minutes apart.

What will happen to the information I provide?
All information collected will be kept confidential. Each participant will be assigned a treatment code and individual participant data will be identifiable only by that code.

All of the data will be stored on password protected secure computers or in a locked cabinet in the Department of Psychology, School of Medicine for a minimum of five years after the publication of any academic journal articles, at which point all questionnaires will be destroyed using a paper shredder and electronic data will be deleted. The screening questionnaire will be securely destroyed immediately on completion of the study and that any information provided by the participant on the questionnaire will be identifiable only by participant number, kept confidential, and viewed only by the experimenter.

Who do I contact if I have any queries?
If you would like to discuss any aspect of this study please contact Emma Johnson (emma.johnson@utas.edu.au) or Sarah Skromanis (sarah.skromanis@utas.edu.au). Alternatively, you can contact Dr Cynthia Honan on (03) 6324 3266 or email cynthia.honan@utas.edu.au.

How do I find out the results of the study?
A summary of the results will be available on the Research webpage of the Discipline of Psychology, University of Tasmania (http://www.utas.edu.au/health/study/psychology). Results of the study can also be provided by contacting the researchers directly.

Who do I contact if I have a complaint about the study?
This study has been approved by the Tasmanian Health and Medical Human Research Ethics Committee. If you have concerns or complaints about the conduct of this study should contact the Executive Officer of the HREC (Tasmania) Network on (03) 6226 7479 or email human.ethics@utas.edu.au. The Executive Officer is the person nominated to receive complaints from research participants. You will need to quote **H0015633**.

Who do I contact if I wish to speak to someone about my alcohol or drug use, or mental health?
As aforementioned, a number of simple screening questionnaires will be administered assessing psychological functioning and alcohol and other drug use. Whilst it is not anticipated that these questionnaires will cause distress, please do not hesitate to let the researcher know if you do not wish to fill them in. If you are concerned about your drinking or mental health, please contact the Tasmanian Alcohol Drug Information Service 1800 811 994 or Lifeline 13 11 14 (both services available 24 hours a day).

Thank you for taking the time to consider this study.
If you wish to take part in it, please sign the attached consent form.
This information sheet is for you to keep.

Appendix E Participant Consent Form

School of Psychology

University of Tasmania

Consent Form

The Impact of Alcohol Consumption on Social Ability

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1. I have read and understood the 'Information Sheet' for this project.
2. The nature and possible effects of the study have been explained to me.
3. I understand that because of my prior participation in eligibility screening session in which I have completed measures of psychological distress and alcohol use, as well as reporting my correct demographic data (age, sex, height and weight) that I am eligible to participate in the study.
4. I understand that I will be asked to abstain from food for 4 hours, caffeine-containing products for 8 hours, and alcohol and prescription medication for 24 hours prior to each session, and illicit drugs and tobacco for the duration of the study. I will be asked to consume a standard meal 60 minutes prior to the experimental session.
5. I will be asked to sign a declaration and complete a breath alcohol concentration measurement (via a breathalyser) to confirm my abstinence at the start of each session.
6. I understand that in the experimental session I may be given a maximum of 6 standard alcoholic drinks, and that I will not be informed of the specific contents of the beverage until the conclusion of testing. I understand that after beverage consumption, I will be asked to complete a number of computerised laboratory behavioural performance tasks during which my behavioural responses will be recorded. I understand that my breath alcohol concentration (as measured via a breathalyser) will be recorded throughout the session, and that I will be asked about my perception of my intoxication and level of impairment.
7. I understand that the study involves attending the Newnham campus of the University of Tasmania (Buildings O and N) for one 100 minute experimental session.
8. I understand that I will be asked to remain in the laboratory until my blood alcohol concentration equals 0.03% or less on two occasions measured 15 minutes apart. This may mean remaining in the laboratory for approximately 3 hours in total.
9. I acknowledge that I have been advised to refrain from drinking alcohol or operating a vehicle or other heavy machinery for four hours after the end of the experimental session.

10. I understand that if I hold a provisional driver licence and I intend to drive I will be required to remain in the laboratory until my breath alcohol concentration is .00% on two consecutive occasions. I understand that if I hold a provisional driver licence and do not intend to drive I will be able to leave the laboratory at .030% BrAC after signing a declaration in which I agree to be escorted by my nominated legal adult to my place of residence and be accompanied for a two hour period following session completion. I understand that the nominated legal guardian must be an adult aged 18 years or older who: (i) holds their provisional or full driver licence (ii) directly collects me from the research premises and meets the researcher in-person, and (iii) signs a declaration agreeing to escort me directly to my place of residence and accompany me for a two hour period following session completion. Furthermore, I understand that the researcher reserves the right to retain participants in the laboratory until .03% BrAC for those holding their full driver licence and .00% BrAC for those holding their provisional licence when it is deemed unsafe for the participant to leave at .03% BrAC. I acknowledge that I have been advised to refrain from drinking alcohol or operating a vehicle or other heavy machinery for four hours after the end of experimental sessions.
11. I understand that I will be entered into a draw to win one of five double movie ticket passes for my participation in this study. I understand that if I am a KHA111/112 student I can opt to be reimbursed up to three hours research participation credit in addition instead of entering the prize draw. If I withdraw from the study prior to concluding all sessions I will not be eligible for reimbursement, unless the withdrawal is due to an unexpected adverse event occurring as a consequence of ingesting the beverage.
12. I understand that, while there are no anticipated risks associated with this study, I should inform the experimenter immediately if any unexpected negative side-effects are experienced. I understand the experimenter will immediately cease the session and seek the necessary assistance.
13. I understand that the researchers will maintain my confidentiality and that any information I supply to the researcher(s) will be used only for the purposes of the research. My data will only be identifiable by an individual numerical participant code.
14. I understand that the screening questionnaire will be securely destroyed immediately on completion of the study and that any information I provide on the questionnaire will be identifiable only by my participant number, kept confidential, and viewed only by the experimenter.
15. I understand that all research data will be securely stored on the University of Tasmania premises for at least five years, and will then be securely destroyed when no longer required.
16. I agree that research data gathered from me for the study may be published provided that I cannot be identified as a participant.
17. I agree to participate in this investigation and understand that I may withdraw at any time without any effect, and if I so wish, may request that any data I have supplied to date be withdrawn from the research.
18. Any questions that I have asked have been answered to my satisfaction.

Name of Participant:

Signature:	Date:

Statement by Investigator

☐ I have explained the project & the implications of participation in it to this volunteer and I believe that the consent is informed and that he/she understands the implications of participation

If the Investigator has not had an opportunity to talk to participants prior to them participating, the following must be ticked.

☐ The participant has received the Information Sheet where my details have been provided so participants have the opportunity to contact me prior to consenting to participate in this project.

Name of Investigator:

Signature:	Date:

Appendix F Widmark Equation

Alcohol Dose (mg) = $W\rho(C_1 + \beta t)$

W	Participants body weight (kg),
ρ	Distribution of alcohol in the body
C_1	target breath alcohol concentration (BrAC; g/100mL),
t	Time (Hours)
β	Rate of alcohol elimination. Set at 0.015g/100mL/hour.

Note: Final alcohol dose (mg) is divided by 0.8 to achieve a dose in millilitres.

Appendix G Statistical Output

Demographic Data

Group Statistics

	Condition	N	Mean	Std. Deviation	Std. Error Mean
Age	alcohol	31	24.548	4.7947	.8612
	placebo	33	22.697	3.3772	.5879

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Age	Equal variances assumed	6.755	.012	1.795	62	.078	1.8514	1.0316	-.2107	3.9135
	Equal variances not assumed			1.776	53.571	.081	1.8514	1.0427	-.2394	3.9423

Group Statistics

	Condition	N	Mean	Std. Deviation	Std. Error Mean
Education	Alcohol	31	11.81	.873	.157
	Placebo	33	11.73	.626	.109

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Education	Equal variances assumed	.168	.684	.419	62	.677	.079	.189	-.299	.457
	Equal variances not assumed			.415	54.163	.680	.079	.191	-.304	.462

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Condition * Sex	64	100.0%	0	0.0%	64	100.0%

Condition * Sex Crosstabulation

			Sex		Total
			male	female	
Condition	alcohol	Count	16	15	31
		Expected Count	15.5	15.5	31.0
		% within Sex	50.0%	46.9%	48.4%
	placebo	Count	16	17	33
		Expected Count	16.5	16.5	33.0
		% within Sex	50.0%	53.1%	51.6%
Total		Count	32	32	64
		Expected Count	32.0	32.0	64.0
		% within Sex	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.063[a]	1	.802		
Continuity Correction[b]	.000	1	1.000		
Likelihood Ratio	.063	1	.802		
Fisher's Exact Test				1.000	.500
Linear-by-Linear Association	.062	1	.804		
N of Valid Cases	64				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 15.50.

b. Computed only for a 2x2 table

Eligibility Assessments

Group Statistics

	Condition	N	Mean	Std. Deviation	Std. Error Mean
AUDIT	alcohol	31	6.645	3.6198	.6501
	placebo	33	5.697	3.1965	.5564

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
AUDIT	Equal variances assumed	.468	.496	1.112	62	.270	.9482	.8524	-.7557	2.6521
	Equal variances not assumed			1.108	59.911	.272	.9482	.8558	-.7636	2.6600

Group Statistics

	Condition	N	Mean	Std. Deviation	Std. Error Mean
K10	alcohol	31	13.935	3.4731	.6238
	placebo	33	14.212	3.0899	.5379

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
K10	Equal variances assumed	.365	.548	-.337	62	.737	-.2766	.8206	-1.9170	1.3638
	Equal variances not assumed			-.336	60.066	.738	-.2766	.8237	-1.9242	1.3709

Group Statistics

	Condition	N	Mean	Std. Deviation	Std. Error Mean
Timeline_Followback	alcohol	31	19.039	16.9974	3.0528
	placebo	33	16.788	15.1446	2.6363

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Timeline_Followback	Equal variances assumed	.404	.527	.560	62	.577	2.2508	4.0189	-5.7829	10.2846
	Equal variances not assumed			.558	60.096	.579	2.2508	4.0336	-5.8173	10.3190

Manipulation Checks

BAES Raw Data

Type III Tests of Fixed Effects[a]

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	64.000	289.252	.000
Condition * subscale	2	320.000	29.160	.000
Condition * time	4	320.000	8.592	.000
Condition * time * subscale	4	320.000	8.575	.000

a. Dependent Variable: score.

Estimates[a]

subscale	Mean	Std. Error	df	95% Confidence Interval	
				Lower Bound	Upper Bound
1	17.467	1.358	86.698	14.767	20.167
2	25.303	1.358	86.698	22.603	28.003

a. Dependent Variable: score.

Pairwise Comparisons[a]

(I) subscale	(J) subscale	Mean Difference (I-J)	Std. Error	df	Sig.[c]	95% Confidence Interval for Difference[c]	
						Lower Bound	Upper Bound
1	2	-7.836*	1.028	320.000	.000	-9.859	-5.813
2	1	7.836*	1.028	320.000	.000	5.813	9.859

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Dependent Variable: score.

c. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests[a]

Numerator df	Denominator df	F	Sig.
1	320.000	58.093	.000

The F tests the effect of subscale. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.[a]

a. Dependent Variable: score.

Estimates[a]

Condition	time	subscale	Mean	Std. Error	df	95% Confidence Interval	
						Lower Bound	Upper Bound
alcohol	1	1	10.097	2.447	189.236	5.271	14.923
		2	25.452	2.447	189.236	20.625	30.278
	2	1	22.806	2.447	189.236	17.980	27.633
		2	32.000	2.447	189.236	27.174	36.826
	3	1	27.290	2.447	189.236	22.464	32.116
		2	25.516	2.447	189.236	20.690	30.342
placebo	1	1	11.909	2.371	189.236	7.232	16.587
		2	25.697	2.371	189.236	21.019	30.375
	2	1	14.515	2.371	189.236	9.838	19.193
		2	22.939	2.371	189.236	18.262	27.617
	3	1	18.182	2.371	189.236	13.504	22.859
		2	20.212	2.371	189.236	15.535	24.890

a. Dependent Variable: score.

Pairwise Comparisons[a]

time	subscale	(I) Condition	(J) Condition	Mean Difference (I-J)	Std. Error	df	Sig.[c]	95% Confidence Interval for Difference[c]	
								Lower Bound	Upper Bound
1	1	alcohol	placebo	-1.812	3.407	189.236	.595	-8.533	4.909
		placebo	alcohol	1.812	3.407	189.236	.595	-4.909	8.533
	2	alcohol	placebo	-.245	3.407	189.236	.943	-6.966	6.476
		placebo	alcohol	.245	3.407	189.236	.943	-6.476	6.966
2	1	alcohol	placebo	8.291*	3.407	189.236	.016	1.570	15.012
		placebo	alcohol	-8.291*	3.407	189.236	.016	-15.012	-1.570
	2	alcohol	placebo	9.061*	3.407	189.236	.009	2.340	15.782
		placebo	alcohol	-9.061*	3.407	189.236	.009	-15.782	-2.340
3	1	alcohol	placebo	9.109*	3.407	189.236	.008	2.388	15.829
		placebo	alcohol	-9.109*	3.407	189.236	.008	-15.829	-2.388
	2	alcohol	placebo	5.304	3.407	189.236	.121	-1.417	12.025
		placebo	alcohol	-5.304	3.407	189.236	.121	-12.025	1.417

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Dependent Variable: score.

c. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests[a]

time	subscale	Numerator df	Denominator df	F	Sig.
1	1	1	189.236	.283	.595
	2	1	189.236	.005	.943
2	1	1	189.236	5.922	.016
	2	1	189.236	7.072	.009
3	1	1	189.236	7.147	.008
	2	1	189.236	2.423	.121

Each F tests the simple effects of Condition within each level combination of the other effects shown. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.[a]

a. Dependent Variable: score.

Estimates[a]

Condition	subscale	Mean	Std. Error	df	95% Confidence Interval	
					Lower Bound	Upper Bound
alcohol	1	20.065	1.951	86.698	16.187	23.942
	2	27.656	1.951	86.698	23.778	31.534
placebo	1	14.869	1.891	86.698	11.110	18.627
	2	22.949	1.891	86.698	19.191	26.708

a. Dependent Variable: score.

Pairwise Comparisons[a]

subscale	(I) Condition	(J) Condition	Mean Difference (I-J)	Std. Error	df	Sig.[b]	95% Confidence Interval for Difference[b]	
							Lower Bound	Upper Bound
1	alcohol	placebo	5.196	2.717	86.698	.059	-.204	10.596
	placebo	alcohol	-5.196	2.717	86.698	.059	-10.596	.204
2	alcohol	placebo	4.706	2.717	86.698	.087	-.694	10.107
	placebo	alcohol	-4.706	2.717	86.698	.087	-10.107	.694

Based on estimated marginal means

a. Dependent Variable: score.

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests[a]

subscale	Numerator df	Denominator df	F	Sig.
1	1	86.698	3.658	.059
2	1	86.698	3.001	.087

Each F tests the simple effects of Condition within each level combination of the other effects shown. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.[a]

a. Dependent Variable: score.

Estimates[a]

time	subscale	Mean	Std. Error	df	95% Confidence Interval	
					Lower Bound	Upper Bound
1	1	11.003	1.704	189.236	7.642	14.363
	2	25.574	1.704	189.236	22.214	28.935
2	1	18.661	1.704	189.236	15.300	22.021
	2	27.470	1.704	189.236	24.109	30.830
3	1	22.736	1.704	189.236	19.376	26.097
	2	22.864	1.704	189.236	19.504	26.225

a. Dependent Variable: score.

Pairwise Comparisons[a]

subscale	(I) time	(J) time	Mean Difference (I-J)	Std. Error	df	Sig.[c]	95% Confidence Interval for Difference[c]	
							Lower Bound	Upper Bound
1	1	2	-7.658*	1.781	320.000	.000	-11.161	-4.154
		3	-11.733*	1.781	320.000	.000	-15.237	-8.230
	2	1	7.658*	1.781	320.000	.000	4.154	11.161
		3	-4.075*	1.781	320.000	.023	-7.579	-.572
	3	1	11.733*	1.781	320.000	.000	8.230	15.237
		2	4.075*	1.781	320.000	.023	.572	7.579
2	1	2	-1.895	1.781	320.000	.288	-5.399	1.608
		3	2.710	1.781	320.000	.129	-.793	6.214
	2	1	1.895	1.781	320.000	.288	-1.608	5.399
		3	4.606*	1.781	320.000	.010	1.102	8.109
	3	1	-2.710	1.781	320.000	.129	-6.214	.793
		2	-4.606*	1.781	320.000	.010	-8.109	-1.102

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Dependent Variable: score.

c. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests[a]

subscale	Numerator df	Denominator df	F	Sig.
1	2	320.000	22.382	.000
2	2	320.000	3.379	.035

Each F tests the simple effects of time within each level combination of the other effects shown. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.[a]

a. Dependent Variable: score.

Estimates[a]

Condition	time	Mean	Std. Error	df	95% Confidence Interval	
					Lower Bound	Upper Bound
alcohol	1	17.774	2.086	111.449	13.641	21.907
	2	27.403	2.086	111.449	23.270	31.536
	3	26.403	2.086	111.449	22.270	30.536
placebo	1	18.803	2.022	111.449	14.797	22.809
	2	18.727	2.022	111.449	14.721	22.733
	3	19.197	2.022	111.449	15.191	23.203

a. Dependent Variable: score.

Pairwise Comparisons[a]

Condition	(I) time	(J) time	Mean Difference (I-J)	Std. Error	df	Sig.[c]	95% Confidence Interval for Difference[c]	
							Lower Bound	Upper Bound
alcohol	1	2	-9.629*	1.808	320.000	.000	-13.187	-6.071
		3	-8.629*	1.808	320.000	.000	-12.187	-5.071
	2	1	9.629*	1.808	320.000	.000	6.071	13.187
		3	1.000	1.808	320.000	.581	-2.558	4.558
	3	1	8.629*	1.808	320.000	.000	5.071	12.187
		2	-1.000	1.808	320.000	.581	-4.558	2.558
placebo	1	2	.076	1.753	320.000	.966	-3.372	3.524
		3	-.394	1.753	320.000	.822	-3.842	3.054
	2	1	-.076	1.753	320.000	.966	-3.524	3.372
		3	-.470	1.753	320.000	.789	-3.918	2.979
	3	1	.394	1.753	320.000	.822	-3.054	3.842
		2	.470	1.753	320.000	.789	-2.979	3.918

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Dependent Variable: score.

c. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests[a]

Condition	Numerator df	Denominator df	F	Sig.
alcohol	2	320.000	17.143	.000
placebo	2	320.000	.041	.959

Each F tests the simple effects of time within each level combination of the other effects shown. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.[a]

a. Dependent Variable: score.

BAES Transformed Data

Type III Tests of Fixed Effects[a]

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	64.000	737.439	.000
Condition * subscale	2	320.000	17.170	.000
Condition * time	4	320.000	4.706	.001
Condition * time * subscale	4	320.000	17.833	.000

a. Dependent Variable: score.

Estimates[a]

subscale	Mean	Std. Error	df	95% Confidence Interval	
				Lower Bound	Upper Bound
1	3.935	.169	84.676	3.599	4.271
2	4.603	.169	84.676	4.267	4.938

a. Dependent Variable: score.

Pairwise Comparisons[a]

(I) subscale	(J) subscale	Mean Difference (I-J)	Std. Error	df	Sig.[c]	95% Confidence Interval for Difference[c]	
						Lower Bound	Upper Bound
1	2	-.668*	.123	320.000	.000	-.910	-.426
2	1	.668*	.123	320.000	.000	.426	.910

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Dependent Variable: score.

c. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests[a]

Numerator df	Denominator df	F	Sig.
1	320.000	29.488	.000

The F tests the effect of subscale. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.[a]

a. Dependent Variable: score.

Estimates[a]

Condition	time	subscale	Mean	Std. Error	df	95% Confidence Interval	
						Lower Bound	Upper Bound
alcohol	1	1	2.906	.300	178.431	2.315	3.498
		2	5.371	.300	178.431	4.779	5.962
	2	1	4.731	.300	178.431	4.140	5.323
		2	4.921	.300	178.431	4.330	5.513
	3	1	4.446	.300	178.431	3.854	5.038
		2	4.669	.300	178.431	4.077	5.261
placebo	1	1	3.152	.291	178.431	2.578	3.725
		2	4.521	.291	178.431	3.947	5.094
	2	1	4.890	.291	178.431	4.317	5.464
		2	3.876	.291	178.431	3.303	4.450
	3	1	3.484	.291	178.431	2.911	4.058
		2	4.257	.291	178.431	3.684	4.831

a. Dependent Variable: score.

Pairwise Comparisons[a]

time	subscale	(I) Condition	(J) Condition	Mean Difference (I-J)	Std. Error	df	Sig.[c]	95% Confidence Interval for Difference[c]	
								Lower Bound	Upper Bound
1	1	alcohol	placebo	-.245	.418	178.431	.558	-1.070	.579
		placebo	alcohol	.245	.418	178.431	.558	-.579	1.070
	2	alcohol	placebo	.850*	.418	178.431	.043	.026	1.674
		placebo	alcohol	-.850*	.418	178.431	.043	-1.674	-.026
2	1	alcohol	placebo	-.159	.418	178.431	.704	-.983	.665
		placebo	alcohol	.159	.418	178.431	.704	-.665	.983
	2	alcohol	placebo	1.045*	.418	178.431	.013	.221	1.869
		placebo	alcohol	-1.045*	.418	178.431	.013	-1.869	-.221
3	1	alcohol	placebo	.962*	.418	178.431	.022	.138	1.786
		placebo	alcohol	-.962*	.418	178.431	.022	-1.786	-.138
	2	alcohol	placebo	.412	.418	178.431	.325	-.412	1.236
		placebo	alcohol	-.412	.418	178.431	.325	-1.236	.412

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Dependent Variable: score.

c. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests[a]

time	subscale	Numerator df	Denominator df	F	Sig.
1	1	1	178.431	.345	.558
	2	1	178.431	4.140	.043
2	1	1	178.431	.145	.704
	2	1	178.431	6.261	.013
3	1	1	178.431	5.303	.022
	2	1	178.431	.972	.325

Each F tests the simple effects of Condition within each level combination of the other effects shown. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.[a]

a. Dependent Variable: score.

Estimates[a]

Condition	subscale	Mean	Std. Error	df	95% Confidence Interval	
					Lower Bound	Upper Bound
alcohol	1	4.028	.242	84.676	3.546	4.510
	2	4.987	.242	84.676	4.505	5.469
placebo	1	3.842	.235	84.676	3.375	4.309
	2	4.218	.235	84.676	3.751	4.685

a. Dependent Variable: score.

Pairwise Comparisons[a]

subscale	(I) Condition	(J) Condition	Mean Difference (I-J)	Std. Error	df	Sig.[c]	95% Confidence Interval for Difference[c]	
							Lower Bound	Upper Bound
1	alcohol	placebo	.186	.338	84.676	.583	-.485	.857
	placebo	alcohol	-.186	.338	84.676	.583	-.857	.485
2	alcohol	placebo	.769*	.338	84.676	.025	.098	1.440
	placebo	alcohol	-.769*	.338	84.676	.025	-1.440	-.098

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Dependent Variable: score.

c. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests[a]

subscale	Numerator df	Denominator df	F	Sig.
1	1	84.676	.303	.583
2	1	84.676	5.187	.025

Each F tests the simple effects of Condition within each level combination of the other effects shown. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.[a]

a. Dependent Variable: score.

Estimates[a]

time	subscale	Mean	Std. Error	df	95% Confidence Interval	
					Lower Bound	Upper Bound
1	1	3.029	.209	178.431	2.617	3.441
	2	4.946	.209	178.431	4.534	5.358
2	1	4.811	.209	178.431	4.399	5.223
	2	4.399	.209	178.431	3.987	4.811
3	1	3.965	.209	178.431	3.553	4.377
	2	4.463	.209	178.431	4.051	4.875

a. Dependent Variable: score.

Pairwise Comparisons[a]

subscale	(I) time	(J) time	Mean Difference (I-J)	Std. Error	df	Sig.[c]	95% Confidence Interval for Difference[c]	
							Lower Bound	Upper Bound
1	1	2	-1.782*	.213	320.000	.000	-2.201	-1.363
		3	-.936*	.213	320.000	.000	-1.355	-.517
	2	1	1.782*	.213	320.000	.000	1.363	2.201
		3	.846*	.213	320.000	.000	.427	1.265
	3	1	.936*	.213	320.000	.000	.517	1.355
		2	-.846*	.213	320.000	.000	-1.265	-.427
2	1	2	.547*	.213	320.000	.011	.128	.966
		3	.482*	.213	320.000	.024	.063	.901
	2	1	-.547*	.213	320.000	.011	-.966	-.128
		3	-.064	.213	320.000	.763	-.483	.355
	3	1	-.482*	.213	320.000	.024	-.901	-.063
		2	.064	.213	320.000	.763	-.355	.483

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Dependent Variable: score.

c. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests[a]

subscale	Numerator df	Denominator df	F	Sig.
1	2	320.000	35.028	.000
2	2	320.000	3.939	.020

Each F tests the simple effects of time within each level combination of the other effects shown. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.[a]

a. Dependent Variable: score.

Estimates[a]

Condition	time	Mean	Std. Error	df	95% Confidence Interval	
					Lower Bound	Upper Bound
alcohol	1	4.138	.258	107.133	3.627	4.650
	2	4.826	.258	107.133	4.315	5.338
	3	4.558	.258	107.133	4.046	5.069
placebo	1	3.836	.250	107.133	3.341	4.332
	2	4.383	.250	107.133	3.888	4.879
	3	3.871	.250	107.133	3.375	4.366

a. Dependent Variable: score.

Pairwise Comparisons[a]

Condition	(I) time	(J) time	Mean Difference (I-J)	Std. Error	df	Sig.[c]	95% Confidence Interval for Difference[c]	
							Lower Bound	Upper Bound
alcohol	1	2	-.688*	.216	320.000	.002	-1.113	-.262
		3	-.419	.216	320.000	.054	-.845	.006
	2	1	.688*	.216	320.000	.002	.262	1.113
		3	.269	.216	320.000	.215	-.157	.694
	3	1	.419	.216	320.000	.054	-.006	.845
		2	-.269	.216	320.000	.215	-.694	.157
placebo	1	2	-.547*	.210	320.000	.009	-.959	-.135
		3	-.034	.210	320.000	.869	-.447	.378
	2	1	.547*	.210	320.000	.009	.135	.959
		3	.512*	.210	320.000	.015	.100	.925
	3	1	.034	.210	320.000	.869	-.378	.447
		2	-.512*	.210	320.000	.015	-.925	-.100

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Dependent Variable: score.

c. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests[a]

Condition	Numerator df	Denominator df	F	Sig.
alcohol	2	320.000	5.139	.006
placebo	2	320.000	4.272	.015

Each F tests the simple effects of time within each level combination of the other effects shown. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.[a]

a. Dependent Variable: score.

Group Statistics

	Condition	N	Mean	Std. Deviation	Std. Error Mean
Drinks	alcohol	31	4.403	1.1062	.1987
	placebo	33	1.485	1.3079	.2277

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Drinks	Equal variances assumed	.548	.462	9.607	62	.000	2.9184	.3038	2.3111	3.5256
	Equal variances not assumed			9.658	61.346	.000	2.9184	.3022	2.3142	3.5226

Baseline Assessment

Group Statistics

	Condition	N	Mean	Std. Deviation	Std. Error Mean
Affect_Naming	alcohol	31	18.387	2.2902	.4113
	placebo	33	18.273	2.2950	.3995

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Affect_Naming	Equal variances assumed	.069	.794	.199	62	.843	.1144	.5735	-1.0319	1.2607
	Equal variances not assumed			.199	61.767	.843	.1144	.5734	-1.0320	1.2607

Experimental Assessment

Type III Tests of Fixed Effects[a]

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	64.000	3217.460	.000
Condition * Emotion	10	1856.000	242.435	.000
Condition * Intensity	8	1856.000	81.097	.000
Condition * Intensity * Emotion	40	1856.000	4.024	.000

a. Dependent Variable: correct.

Estimates[a]

Emotion	Mean	Std. Error	df	95% Confidence Interval	
				Lower Bound	Upper Bound
1	3.596	.058	273.469	3.481	3.710
2	1.984	.058	273.469	1.869	2.098
3	.972	.058	273.469	.858	1.087
4	3.066	.058	273.469	2.952	3.181
5	2.671	.058	273.469	2.556	2.785
6	1.364	.058	273.469	1.249	1.478

a. Dependent Variable: correct.

Pairwise Comparisons[a]

(I) Emotion	(J) Emotion	Mean Difference (I-J)	Std. Error	df	Sig.[c]	95% Confidence Interval for Difference[c]	
						Lower Bound	Upper Bound
1	2	1.612*	.065	1856.000	.000	1.484	1.740
	3	2.623*	.065	1856.000	.000	2.495	2.752
	4	.529*	.065	1856.000	.000	.401	.658
	5	.925*	.065	1856.000	.000	.796	1.053
	6	2.232*	.065	1856.000	.000	2.104	2.360
2	1	-1.612*	.065	1856.000	.000	-1.740	-1.484
	3	1.011*	.065	1856.000	.000	.883	1.140
	4	-1.083*	.065	1856.000	.000	-1.211	-.954
	5	-.687*	.065	1856.000	.000	-.816	-.559
	6	.620*	.065	1856.000	.000	.491	.748
3	1	-2.623*	.065	1856.000	.000	-2.752	-2.495
	2	-1.011*	.065	1856.000	.000	-1.140	-.883
	4	-2.094*	.065	1856.000	.000	-2.222	-1.965
	5	-1.698*	.065	1856.000	.000	-1.827	-1.570
	6	-.391*	.065	1856.000	.000	-.520	-.263
4	1	-.529*	.065	1856.000	.000	-.658	-.401
	2	1.083*	.065	1856.000	.000	.954	1.211
	3	2.094*	.065	1856.000	.000	1.965	2.222
	5	.396*	.065	1856.000	.000	.267	.524
	6	1.703*	.065	1856.000	.000	1.574	1.831
5	1	-.925*	.065	1856.000	.000	-1.053	-.796
	2	.687*	.065	1856.000	.000	.559	.816
	3	1.698*	.065	1856.000	.000	1.570	1.827
	4	-.396*	.065	1856.000	.000	-.524	-.267
	6	1.307*	.065	1856.000	.000	1.179	1.435
6	1	-2.232*	.065	1856.000	.000	-2.360	-2.104
	2	-.620*	.065	1856.000	.000	-.748	-.491
	3	.391*	.065	1856.000	.000	.263	.520
	4	-1.703*	.065	1856.000	.000	-1.831	-1.574
	5	-1.307*	.065	1856.000	.000	-1.435	-1.179

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Dependent Variable: correct.

c. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests[a]

Numerator df	Denominator df	F	Sig.
5	1856.000	479.250	.000

The F tests the effect of Emotion. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.[a]

a. Dependent Variable: correct.

Estimates[a]

Condition	Mean	Std. Error	df	95% Confidence Interval	
				Lower Bound	Upper Bound
alcohol	2.120	.058	64.000	2.005	2.236
placebo	2.430	.056	64.000	2.319	2.542

a. Dependent Variable: correct.

Pairwise Comparisons[a]

(I) Condition	(J) Condition	Mean Difference (I-J)	Std. Error	df	Sig.[c]	95% Confidence Interval for Difference[c]	
						Lower Bound	Upper Bound
alcohol	placebo	-.310*	.080	64.000	.000	-.470	-.150
placebo	alcohol	.310*	.080	64.000	.000	.150	.470

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Dependent Variable: correct.

c. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests[a]

Numerator df	Denominator df	F	Sig.
1	64.000	14.918	.000

The F tests the effect of Condition. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.[a]

a. Dependent Variable: correct.

Estimates[a]

Intensity	Mean	Std. Error	df	95% Confidence Interval	
				Lower Bound	Upper Bound
1	1.373	.055	222.201	1.264	1.481
2	2.224	.055	222.201	2.115	2.333
3	2.530	.055	222.201	2.421	2.638
4	2.542	.055	222.201	2.434	2.651
5	2.708	.055	222.201	2.600	2.817

a. Dependent Variable: correct.

Pairwise Comparisons[a]

(I) Intensity	(J) Intensity	Mean Difference (I-J)	Std. Error	df	Sig.[c]	95% Confidence Interval for Difference[c]	
						Lower Bound	Upper Bound
1	2	-.851*	.060	1856.000	.000	-.969	-.734
	3	-1.157*	.060	1856.000	.000	-1.274	-1.040
	4	-1.170*	.060	1856.000	.000	-1.287	-1.053
	5	-1.336*	.060	1856.000	.000	-1.453	-1.218
2	1	.851*	.060	1856.000	.000	.734	.969
	3	-.306*	.060	1856.000	.000	-.423	-.188
	4	-.318*	.060	1856.000	.000	-.436	-.201
	5	-.484*	.060	1856.000	.000	-.601	-.367
3	1	1.157*	.060	1856.000	.000	1.040	1.274
	2	.306*	.060	1856.000	.000	.188	.423
	4	-.013	.060	1856.000	.830	-.130	.104
	5	-.179*	.060	1856.000	.003	-.296	-.061
4	1	1.170*	.060	1856.000	.000	1.053	1.287
	2	.318*	.060	1856.000	.000	.201	.436
	3	.013	.060	1856.000	.830	-.104	.130
	5	-.166*	.060	1856.000	.006	-.283	-.049
5	1	1.336*	.060	1856.000	.000	1.218	1.453
	2	.484*	.060	1856.000	.000	.367	.601
	3	.179*	.060	1856.000	.003	.061	.296
	4	.166*	.060	1856.000	.006	.049	.283

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Dependent Variable: correct.

c. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests[a]

Numerator df	Denominator df	F	Sig.
4	1856.000	159.605	.000

The F tests the effect of Intensity. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.[a]

a. Dependent Variable: correct.

Estimates[a]

Condition	Intensity	Emotion	Mean	Std. Error	df	95% Confidence Interval	
						Lower Bound	Upper Bound
alcohol	1	1	2.323	.157	1457.994	2.014	2.631
		2	.839	.157	1457.994	.530	1.147
		3	.516	.157	1457.994	.208	.824
		4	2.258	.157	1457.994	1.950	2.566
		5	1.419	.157	1457.994	1.111	1.728
		6	.419	.157	1457.994	.111	.728
	2	1	3.710	.157	1457.994	3.401	4.018
		2	1.839	.157	1457.994	1.530	2.147
		3	.613	.157	1457.994	.305	.921
		4	3.097	.157	1457.994	2.789	3.405
		5	2.516	.157	1457.994	2.208	2.824
		6	.581	.157	1457.994	.272	.889
	3	1	3.903	.157	1457.994	3.595	4.211
		2	2.258	.157	1457.994	1.950	2.566
		3	.613	.157	1457.994	.305	.921
		4	3.290	.157	1457.994	2.982	3.599
		5	3.226	.157	1457.994	2.918	3.534
		6	1.065	.157	1457.994	.756	1.373
	4	1	3.935	.157	1457.994	3.627	4.244
		2	2.161	.157	1457.994	1.853	2.470
		3	.645	.157	1457.994	.337	.953
		4	2.871	.157	1457.994	2.563	3.179
		5	3.032	.157	1457.994	2.724	3.341
		6	1.258	.157	1457.994	.950	1.566
	5	1	3.903	.157	1457.994	3.595	4.211
		2	2.194	.157	1457.994	1.885	2.502
		3	1.065	.157	1457.994	.756	1.373
		4	3.419	.157	1457.994	3.111	3.728
		5	2.968	.157	1457.994	2.659	3.276
		6	1.677	.157	1457.994	1.369	1.986
placebo	1	1	2.394	.152	1457.994	2.095	2.693
		2	1.212	.152	1457.994	.913	1.511
		3	.818	.152	1457.994	.519	1.117
		4	2.182	.152	1457.994	1.883	2.481
		5	1.394	.152	1457.994	1.095	1.693
		6	.697	.152	1457.994	.398	.996
	2	1	3.939	.152	1457.994	3.641	4.238
		2	2.273	.152	1457.994	1.974	2.572
		3	1.121	.152	1457.994	.822	1.420
		4	3.182	.152	1457.994	2.883	3.481
		5	2.788	.152	1457.994	2.489	3.087
		6	1.030	.152	1457.994	.732	1.329
	3	1	3.939	.152	1457.994	3.641	4.238
		2	2.212	.152	1457.994	1.913	2.511
		3	1.303	.152	1457.994	1.004	1.602
		4	3.576	.152	1457.994	3.277	3.875
		5	3.121	.152	1457.994	2.822	3.420
		6	1.848	.152	1457.994	1.550	2.147
	4	1	3.970	.152	1457.994	3.671	4.268
		2	2.485	.152	1457.994	2.186	2.784
		3	1.364	.152	1457.994	1.065	1.662
		4	3.333	.152	1457.994	3.035	3.632
		5	3.091	.152	1457.994	2.792	3.390
		6	2.364	.152	1457.994	2.065	2.662
	5	1	3.939	.152	1457.994	3.641	4.238
		2	2.364	.152	1457.994	2.065	2.662
		3	1.667	.152	1457.994	1.368	1.965
		4	3.455	.152	1457.994	3.156	3.753
		5	3.152	.152	1457.994	2.853	3.450
		6	2.697	.152	1457.994	2.398	2.996

a. Dependent Variable: correct.

Pairwise Comparisons[a]

Intensity	Emotion	(I) Condition	(J) Condition	Mean Difference (I-J)	Std. Error	df	Sig.[c]	95% Confidence Interval for Difference[c]	
								Lower Bound	Upper Bound
1	1	alcohol	placebo	-.071	.219	1457.994	.744	-.501	.358
		placebo	alcohol	.071	.219	1457.994	.744	-.358	.501
	2	alcohol	placebo	-.373	.219	1457.994	.088	-.803	.056
		placebo	alcohol	.373	.219	1457.994	.088	-.056	.803
	3	alcohol	placebo	-.302	.219	1457.994	.168	-.731	.127
		placebo	alcohol	.302	.219	1457.994	.168	-.127	.731
	4	alcohol	placebo	.076	.219	1457.994	.728	-.353	.506
		placebo	alcohol	-.076	.219	1457.994	.728	-.506	.353
	5	alcohol	placebo	.025	.219	1457.994	.908	-.404	.455
		placebo	alcohol	-.025	.219	1457.994	.908	-.455	.404
	6	alcohol	placebo	-.278	.219	1457.994	.205	-.707	.152
		placebo	alcohol	.278	.219	1457.994	.205	-.152	.707
2	1	alcohol	placebo	-.230	.219	1457.994	.294	-.659	.200
		placebo	alcohol	.230	.219	1457.994	.294	-.200	.659
	2	alcohol	placebo	-.434*	.219	1457.994	.048	-.863	-.005
		placebo	alcohol	.434*	.219	1457.994	.048	.005	.863
	3	alcohol	placebo	-.508*	.219	1457.994	.020	-.938	-.079
		placebo	alcohol	.508*	.219	1457.994	.020	.079	.938
	4	alcohol	placebo	-.085	.219	1457.994	.698	-.514	.344
		placebo	alcohol	.085	.219	1457.994	.698	-.344	.514
	5	alcohol	placebo	-.272	.219	1457.994	.215	-.701	.158
		placebo	alcohol	.272	.219	1457.994	.215	-.158	.701
	6	alcohol	placebo	-.450*	.219	1457.994	.040	-.879	-.020
		placebo	alcohol	.450*	.219	1457.994	.040	.020	.879
3	1	alcohol	placebo	-.036	.219	1457.994	.869	-.465	.393
		placebo	alcohol	.036	.219	1457.994	.869	-.393	.465
	2	alcohol	placebo	.046	.219	1457.994	.834	-.383	.475
		placebo	alcohol	-.046	.219	1457.994	.834	-.475	.383
	3	alcohol	placebo	-.690*	.219	1457.994	.002	-1.119	-.261
		placebo	alcohol	.690*	.219	1457.994	.002	.261	1.119
	4	alcohol	placebo	-.285	.219	1457.994	.192	-.715	.144
		placebo	alcohol	.285	.219	1457.994	.192	-.144	.715
	5	alcohol	placebo	.105	.219	1457.994	.633	-.325	.534
		placebo	alcohol	-.105	.219	1457.994	.633	-.534	.325
	6	alcohol	placebo	-.784*	.219	1457.994	.000	-1.213	-.355
		placebo	alcohol	.784*	.219	1457.994	.000	.355	1.213
4	1	alcohol	placebo	-.034	.219	1457.994	.876	-.464	.395
		placebo	alcohol	.034	.219	1457.994	.876	-.395	.464
	2	alcohol	placebo	-.324	.219	1457.994	.140	-.753	.106
		placebo	alcohol	.324	.219	1457.994	.140	-.106	.753
	3	alcohol	placebo	-.718*	.219	1457.994	.001	-1.148	-.289
		placebo	alcohol	.718*	.219	1457.994	.001	.289	1.148
	4	alcohol	placebo	-.462*	.219	1457.994	.035	-.892	-.033
		placebo	alcohol	.462*	.219	1457.994	.035	.033	.892
	5	alcohol	placebo	-.059	.219	1457.994	.789	-.488	.371
		placebo	alcohol	.059	.219	1457.994	.789	-.371	.488
	6	alcohol	placebo	-1.106*	.219	1457.994	.000	-1.535	-.676
		placebo	alcohol	1.106*	.219	1457.994	.000	.676	1.535
5	1	alcohol	placebo	-.036	.219	1457.994	.869	-.465	.393
		placebo	alcohol	.036	.219	1457.994	.869	-.393	.465
	2	alcohol	placebo	-.170	.219	1457.994	.437	-.599	.259
		placebo	alcohol	.170	.219	1457.994	.437	-.259	.599
	3	alcohol	placebo	-.602*	.219	1457.994	.006	-1.031	-.173
		placebo	alcohol	.602*	.219	1457.994	.006	.173	1.031
	4	alcohol	placebo	-.035	.219	1457.994	.872	-.464	.394
		placebo	alcohol	.035	.219	1457.994	.872	-.394	.464
	5	alcohol	placebo	-.184	.219	1457.994	.401	-.613	.246
		placebo	alcohol	.184	.219	1457.994	.401	-.246	.613
	6	alcohol	placebo	-1.020*	.219	1457.994	.000	-1.449	-.590
		placebo	alcohol	1.020*	.219	1457.994	.000	.590	1.449

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Dependent Variable: correct.

c. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests[a]

Intensity	Emotion	Numerator df	Denominator df	F	Sig.
1	1	1	1457.994	.106	.744
	2	1	1457.994	2.911	.088
	3	1	1457.994	1.905	.168
	4	1	1457.994	.121	.728
	5	1	1457.994	.013	.908
	6	1	1457.994	1.609	.205
2	1	1	1457.994	1.102	.294
	2	1	1457.994	3.933	.048
	3	1	1457.994	5.394	.020
	4	1	1457.994	.151	.698
	5	1	1457.994	1.542	.215
	6	1	1457.994	4.221	.040
3	1	1	1457.994	.027	.869
	2	1	1457.994	.044	.834
	3	1	1457.994	9.944	.002
	4	1	1457.994	1.701	.192
	5	1	1457.994	.228	.633
	6	1	1457.994	12.832	.000
4	1	1	1457.994	.024	.876
	2	1	1457.994	2.186	.140
	3	1	1457.994	10.777	.001
	4	1	1457.994	4.463	.035
	5	1	1457.994	.072	.789
	6	1	1457.994	25.519	.000
5	1	1	1457.994	.027	.869
	2	1	1457.994	.604	.437
	3	1	1457.994	7.570	.006
	4	1	1457.994	.026	.872
	5	1	1457.994	.705	.401
	6	1	1457.994	21.702	.000

Each F tests the simple effects of Condition within each level combination of the other effects shown. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.[a]

a. Dependent Variable: correct.

Estimates[a]

Condition	Emotion	Mean	Std. Error	df	95% Confidence Interval	
					Lower Bound	Upper Bound
alcohol	1	3.555	.084	273.469	3.390	3.720
	2	1.858	.084	273.469	1.693	2.023
	3	.690	.084	273.469	.526	.855
	4	2.987	.084	273.469	2.822	3.152
	5	2.632	.084	273.469	2.467	2.797
	6	1.000	.084	273.469	.835	1.165
placebo	1	3.636	.081	273.469	3.477	3.796
	2	2.109	.081	273.469	1.949	2.269
	3	1.255	.081	273.469	1.095	1.414
	4	3.145	.081	273.469	2.986	3.305
	5	2.709	.081	273.469	2.549	2.869
	6	1.727	.081	273.469	1.568	1.887

a. Dependent Variable: correct.

Pairwise Comparisons[a]

Emotion	(I) Condition	(J) Condition	Mean Difference (I-J)	Std. Error	df	Sig.[c]	95% Confidence Interval for Difference[c]	
							Lower Bound	Upper Bound
1	alcohol	placebo	-.082	.117	273.469	.485	-.311	.148
	placebo	alcohol	.082	.117	273.469	.485	-.148	.311
2	alcohol	placebo	-.251*	.117	273.469	.032	-.480	-.022
	placebo	alcohol	.251*	.117	273.469	.032	.022	.480
3	alcohol	placebo	-.564*	.117	273.469	.000	-.794	-.335
	placebo	alcohol	.564*	.117	273.469	.000	.335	.794
4	alcohol	placebo	-.158	.117	273.469	.175	-.388	.071
	placebo	alcohol	.158	.117	273.469	.175	-.071	.388
5	alcohol	placebo	-.077	.117	273.469	.510	-.306	.153
	placebo	alcohol	.077	.117	273.469	.510	-.153	.306
6	alcohol	placebo	-.727*	.117	273.469	.000	-.957	-.498
	placebo	alcohol	.727*	.117	273.469	.000	.498	.957

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Dependent Variable: correct.

c. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests[a]

Emotion	Numerator df	Denominator df	F	Sig.
1	1	273.469	.489	.485
2	1	273.469	4.639	.032
3	1	273.469	23.434	.000
4	1	273.469	1.846	.175
5	1	273.469	.435	.510
6	1	273.469	38.935	.000

Each F tests the simple effects of Condition within each level combination of the other effects shown. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.[a]

a. Dependent Variable: correct.

Estimates[a]

Intensity	Emotion	Mean	Std. Error	df	95% Confidence Interval	
					Lower Bound	Upper Bound
1	1	2.358	.109	1457.994	2.144	2.573
	2	1.025	.109	1457.994	.811	1.240
	3	.667	.109	1457.994	.453	.882
	4	2.220	.109	1457.994	2.005	2.435
	5	1.407	.109	1457.994	1.192	1.621
	6	.558	.109	1457.994	.344	.773
2	1	3.825	.109	1457.994	3.610	4.039
	2	2.056	.109	1457.994	1.841	2.270
	3	.867	.109	1457.994	.652	1.082
	4	3.139	.109	1457.994	2.925	3.354
	5	2.652	.109	1457.994	2.437	2.867
	6	.805	.109	1457.994	.591	1.020
3	1	3.921	.109	1457.994	3.707	4.136
	2	2.235	.109	1457.994	2.020	2.450
	3	.958	.109	1457.994	.743	1.173
	4	3.433	.109	1457.994	3.218	3.648
	5	3.174	.109	1457.994	2.959	3.388
	6	1.457	.109	1457.994	1.242	1.671
4	1	3.953	.109	1457.994	3.738	4.167
	2	2.323	.109	1457.994	2.108	2.538
	3	1.004	.109	1457.994	.790	1.219
	4	3.102	.109	1457.994	2.887	3.317
	5	3.062	.109	1457.994	2.847	3.276
	6	1.811	.109	1457.994	1.596	2.026
5	1	3.921	.109	1457.994	3.707	4.136
	2	2.279	.109	1457.994	2.064	2.493
	3	1.366	.109	1457.994	1.151	1.580
	4	3.437	.109	1457.994	3.222	3.652
	5	3.060	.109	1457.994	2.845	3.274
	6	2.187	.109	1457.994	1.973	2.402

a. Dependent Variable: correct.

Pairwise Comparisons[a]

Emotion	(I) Intensity	(J) Intensity	Mean Difference (I-J)	Std. Error	df	Sig.[c]	95% Confidence Interval for Difference[c]	
							Lower Bound	Upper Bound
1	1	2	-1.466*	.146	1856.000	.000	-1.753	-1.179
		3	-1.563*	.146	1856.000	.000	-1.850	-1.276
		4	-1.594*	.146	1856.000	.000	-1.882	-1.307
		5	-1.563*	.146	1856.000	.000	-1.850	-1.276
	2	1	1.466*	.146	1856.000	.000	1.179	1.753
		3	-.097	.146	1856.000	.509	-.384	.190
		4	-.128	.146	1856.000	.382	-.415	.159
		5	-.097	.146	1856.000	.509	-.384	.190
	3	1	1.563*	.146	1856.000	.000	1.276	1.850
		2	.097	.146	1856.000	.509	-.190	.384
		4	-.031	.146	1856.000	.831	-.318	.256
		5	-5.836E-13	.146	1856.000	1.000	-.287	.287
	4	1	1.594*	.146	1856.000	.000	1.307	1.882
		2	.128	.146	1856.000	.382	-.159	.415
		3	.031	.146	1856.000	.831	-.256	.318
		5	.031	.146	1856.000	.831	-.256	.318
	5	1	1.563*	.146	1856.000	.000	1.276	1.850
		2	.097	.146	1856.000	.509	-.190	.384
		3	5.836E-13	.146	1856.000	1.000	-.287	.287
		4	-.031	.146	1856.000	.831	-.318	.256
2	1	2	-1.030*	.146	1856.000	.000	-1.318	-.743
		3	-1.210*	.146	1856.000	.000	-1.497	-.922
		4	-1.298*	.146	1856.000	.000	-1.585	-1.010
		5	-1.253*	.146	1856.000	.000	-1.540	-.966
	2	1	1.030*	.146	1856.000	.000	.743	1.318
		3	-.179	.146	1856.000	.221	-.467	.108
		4	-.267	.146	1856.000	.068	-.555	.020
		5	-.223	.146	1856.000	.128	-.510	.064
	3	1	1.210*	.146	1856.000	.000	.922	1.497
		2	.179	.146	1856.000	.221	-.108	.467
		4	-.088	.146	1856.000	.548	-.375	.199
		5	-.043	.146	1856.000	.766	-.331	.244
	4	1	1.298*	.146	1856.000	.000	1.010	1.585
		2	.267	.146	1856.000	.068	-.020	.555
		3	.088	.146	1856.000	.548	-.199	.375
		5	.044	.146	1856.000	.761	-.243	.332
	5	1	1.253*	.146	1856.000	.000	.966	1.540
		2	.223	.146	1856.000	.128	-.064	.510
		3	.043	.146	1856.000	.766	-.244	.331
		4	-.044	.146	1856.000	.761	-.332	.243

3	1	2	-.200	.146	1856.000	.172	-.487	.087
		3	-.291*	.146	1856.000	.047	-.578	-.004
		4	-.337*	.146	1856.000	.021	-.624	-.050
		5	-.698*	.146	1856.000	.000	-.986	-.411
	2	1	.200	.146	1856.000	.172	-.087	.487
		3	-.091	.146	1856.000	.535	-.378	.196
		4	-.137	.146	1856.000	.348	-.425	.150
		5	-.499*	.146	1856.000	.001	-.786	-.211
	3	1	.291*	.146	1856.000	.047	.004	.578
		2	.091	.146	1856.000	.535	-.196	.378
		4	-.046	.146	1856.000	.751	-.334	.241
		5	-.408*	.146	1856.000	.005	-.695	-.120
	4	1	.337*	.146	1856.000	.021	.050	.624
		2	.137	.146	1856.000	.348	-.150	.425
		3	.046	.146	1856.000	.751	-.241	.334
		5	-.361*	.146	1856.000	.014	-.648	-.074
	5	1	.698*	.146	1856.000	.000	.411	.986
		2	.499*	.146	1856.000	.001	.211	.786
		3	.408*	.146	1856.000	.005	.120	.695
		4	.361*	.146	1856.000	.014	.074	.648
4	1	2	-.919*	.146	1856.000	.000	-1.207	-.632
		3	-1.213*	.146	1856.000	.000	-1.500	-.926
		4	-.882*	.146	1856.000	.000	-1.169	-.595
		5	-1.217*	.146	1856.000	.000	-1.504	-.930
	2	1	.919*	.146	1856.000	.000	.632	1.207
		3	-.294*	.146	1856.000	.045	-.581	-.007
		4	.037	.146	1856.000	.800	-.250	.324
		5	-.298*	.146	1856.000	.042	-.585	-.010
	3	1	1.213*	.146	1856.000	.000	.926	1.500
		2	.294*	.146	1856.000	.045	.007	.581
		4	.331*	.146	1856.000	.024	.044	.618
		5	-.004	.146	1856.000	.979	-.291	.283
	4	1	.882*	.146	1856.000	.000	.595	1.169
		2	-.037	.146	1856.000	.800	-.324	.250
		3	-.331*	.146	1856.000	.024	-.618	-.044
		5	-.335*	.146	1856.000	.022	-.622	-.048
5	1	2	-1.245*	.146	1856.000	.000	-1.533	-.958
		3	-1.767*	.146	1856.000	.000	-2.054	-1.480
		4	-1.655*	.146	1856.000	.000	-1.942	-1.368
		5	-1.653*	.146	1856.000	.000	-1.940	-1.366
	2	1	1.245*	.146	1856.000	.000	.958	1.533
		3	-.522*	.146	1856.000	.000	-.809	-.234
		4	-.410*	.146	1856.000	.005	-.697	-.122
		5	-.408*	.146	1856.000	.005	-.695	-.120
	3	1	1.767*	.146	1856.000	.000	1.480	2.054
		2	.522*	.146	1856.000	.000	.234	.809
		4	.112	.146	1856.000	.445	-.175	.399
		5	.114	.146	1856.000	.437	-.173	.401
	4	1	1.655*	.146	1856.000	.000	1.368	1.942
		2	.410*	.146	1856.000	.005	.122	.697
		3	-.112	.146	1856.000	.445	-.399	.175
		5	.002	.146	1856.000	.989	-.285	.289
	5	1	1.653*	.146	1856.000	.000	1.366	1.940
		2	.408*	.146	1856.000	.005	.120	.695
		3	-.114	.146	1856.000	.437	-.401	.173
		4	-.002	.146	1856.000	.989	-.289	.285

6	1	2	-.247	.146	1856.000	.091	-.535	.040
		3	-.898*	.146	1856.000	.000	-1.186	-.611
		4	-1.253*	.146	1856.000	.000	-1.540	-.965
		5	-1.629*	.146	1856.000	.000	-1.916	-1.342
	2	1	.247	.146	1856.000	.091	-.040	.535
		3	-.651*	.146	1856.000	.000	-.938	-.364
		4	-1.005*	.146	1856.000	.000	-1.293	-.718
		5	-1.382*	.146	1856.000	.000	-1.669	-1.095
	3	1	.898*	.146	1856.000	.000	.611	1.186
		2	.651*	.146	1856.000	.000	.364	.938
		4	-.354*	.146	1856.000	.016	-.642	-.067
		5	-.731*	.146	1856.000	.000	-1.018	-.443
	4	1	1.253*	.146	1856.000	.000	.965	1.540
		2	1.005*	.146	1856.000	.000	.718	1.293
		3	.354*	.146	1856.000	.016	.067	.642
		5	-.376*	.146	1856.000	.010	-.664	-.089
	5	1	1.629*	.146	1856.000	.000	1.342	1.916
		2	1.382*	.146	1856.000	.000	1.095	1.669
		3	.731*	.146	1856.000	.000	.443	1.018
		4	.376*	.146	1856.000	.010	.089	.664

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Dependent Variable: correct.

c. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests[a]

Emotion	Numerator df	Denominator df	F	Sig.
1	4	1856.000	44.836	.000
2	4	1856.000	27.718	.000
3	4	1856.000	6.064	.000
4	4	1856.000	23.194	.000
5	4	1856.000	50.245	.000
6	4	1856.000	43.068	.000

Each F tests the simple effects of Intensity within each level combination of the other effects shown. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.[a]

a. Dependent Variable: correct.

Estimates[a]

Condition	Intensity	Mean	Std. Error	df	95% Confidence Interval	
					Lower Bound	Upper Bound
alcohol	1	1.296	.079	222.201	1.140	1.452
	2	2.059	.079	222.201	1.903	2.215
	3	2.392	.079	222.201	2.236	2.548
	4	2.317	.079	222.201	2.161	2.473
	5	2.538	.079	222.201	2.382	2.694
placebo	1	1.449	.077	222.201	1.298	1.601
	2	2.389	.077	222.201	2.238	2.540
	3	2.667	.077	222.201	2.515	2.818
	4	2.768	.077	222.201	2.616	2.919
	5	2.879	.077	222.201	2.728	3.030

a. Dependent Variable: correct.

Pairwise Comparisons[a]

Condition	(I) Intensity	(J) Intensity	Mean Difference (I-J)	Std. Error	df	Sig.[c]	95% Confidence Interval for Difference[c]	
							Lower Bound	Upper Bound
alcohol	1	2	-.763*	.086	1856.000	.000	-.932	-.595
		3	-1.097*	.086	1856.000	.000	-1.265	-.928
		4	-1.022*	.086	1856.000	.000	-1.190	-.853
		5	-1.242*	.086	1856.000	.000	-1.410	-1.074
	2	1	.763*	.086	1856.000	.000	.595	.932
		3	-.333*	.086	1856.000	.000	-.502	-.165
		4	-.258*	.086	1856.000	.003	-.426	-.090
		5	-.478*	.086	1856.000	.000	-.647	-.310
	3	1	1.097*	.086	1856.000	.000	.928	1.265
		2	.333*	.086	1856.000	.000	.165	.502
		4	.075	.086	1856.000	.381	-.093	.244
		5	-.145	.086	1856.000	.091	-.314	.023
	4	1	1.022*	.086	1856.000	.000	.853	1.190
		2	.258*	.086	1856.000	.003	.090	.426
		3	-.075	.086	1856.000	.381	-.244	.093
		5	-.220*	.086	1856.000	.010	-.389	-.052
	5	1	1.242*	.086	1856.000	.000	1.074	1.410
		2	.478*	.086	1856.000	.000	.310	.647
		3	.145	.086	1856.000	.091	-.023	.314
		4	.220*	.086	1856.000	.010	.052	.389
placebo	1	2	-.939*	.083	1856.000	.000	-1.103	-.776
		3	-1.217*	.083	1856.000	.000	-1.380	-1.054
		4	-1.318*	.083	1856.000	.000	-1.481	-1.155
		5	-1.429*	.083	1856.000	.000	-1.593	-1.266
	2	1	.939*	.083	1856.000	.000	.776	1.103
		3	-.278*	.083	1856.000	.001	-.441	-.115
		4	-.379*	.083	1856.000	.000	-.542	-.216
		5	-.490*	.083	1856.000	.000	-.653	-.327
	3	1	1.217*	.083	1856.000	.000	1.054	1.380
		2	.278*	.083	1856.000	.001	.115	.441
		4	-.101	.083	1856.000	.225	-.264	.062
		5	-.212*	.083	1856.000	.011	-.375	-.049
	4	1	1.318*	.083	1856.000	.000	1.155	1.481
		2	.379*	.083	1856.000	.000	.216	.542
		3	.101	.083	1856.000	.225	-.062	.264
		5	-.111	.083	1856.000	.182	-.274	.052
	5	1	1.429*	.083	1856.000	.000	1.266	1.593
		2	.490*	.083	1856.000	.000	.327	.653
		3	.212*	.083	1856.000	.011	.049	.375
		4	.111	.083	1856.000	.182	-.052	.274

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Dependent Variable: correct.

c. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests[a]

Condition	Numerator df	Denominator df	F	Sig.
alcohol	4	1856.000	65.840	.000
placebo	4	1856.000	96.355	.000

Each F tests the simple effects of Intensity within each level combination of the other effects shown. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.[a]

a. Dependent Variable: correct.

One-Sample Statistics

group		N	Mean	Std. Deviation	Std. Error Mean
alcohol	emotion	182	.147801	.2189348	.0162285
placebo	emotion	188	.222529	.2852093	.0208010

One-Sample Test

		Test Value = 0					
						95% Confidence Interval of the Difference	
group		t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
alcohol	emotion	9.107	181	.000	.1478010	.115780	.179822
placebo	emotion	10.698	187	.000	.2225293	.181495	.263564

Descriptives

group				Statistic	Std. Error
alcohol	emotion	Mean		.147801	.0162285
		95% Confidence Interval for Mean	Lower Bound	.115780	
			Upper Bound	.179822	
		5% Trimmed Mean		.117896	
		Median		.054064	
		Variance		.048	
		Std. Deviation		.2189348	
		Minimum		.0000	
		Maximum		1.0000	
		Range		1.0000	
		Interquartile Range		.2177	
		Skewness		2.118	.180
		Kurtosis		4.762	.358
placebo	emotion	Mean		.222529	.0208010
		95% Confidence Interval for Mean	Lower Bound	.181495	
			Upper Bound	.263564	
		5% Trimmed Mean		.191699	
		Median		.106529	
		Variance		.081	
		Std. Deviation		.2852093	
		Minimum		.0000	
		Maximum		1.0000	
		Range		1.0000	
		Interquartile Range		.3171	
		Skewness		1.542	.177
		Kurtosis		1.582	.353

One-Sample Statistics

group		N	Mean	Std. Deviation	Std. Error Mean
alcohol	OU	186	.175136	.3063810	.0224649
placebo	OU	198	.134859	.2598707	.0184682

One-Sample Test

		Test Value = 0					
						95% Confidence Interval of the Difference	
group		t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
alcohol	OU	7.796	185	.000	.1751357	.130815	.219456
placebo	OU	7.302	197	.000	.1348587	.098438	.171279

Descriptives

group				Statistic	Std. Error
alcohol	OU	Mean		.175136	.0224649
		95% Confidence Interval for Mean	Lower Bound	.130815	
			Upper Bound	.219456	
		5% Trimmed Mean		.168706	
		Median		.123685	
		Variance		.094	
		Std. Deviation		.3063810	
		Minimum		-.4000	
		Maximum		.8400	
		Range		1.2400	
		Interquartile Range		.4636	
		Skewness		.394	.178
		Kurtosis		-.720	.355
placebo	OU	Mean		.134859	.0184682
		95% Confidence Interval for Mean	Lower Bound	.098438	
			Upper Bound	.171279	
		5% Trimmed Mean		.126414	
		Median		.100000	
		Variance		.068	
		Std. Deviation		.2598707	
		Minimum		-.3263	
		Maximum		.8250	
		Range		1.1513	
		Interquartile Range		.4007	
		Skewness		.431	.173
		Kurtosis		-.495	.344

One-Sample Statistics

group		N	Mean	Std. Deviation	Std. Error Mean
alcohol	Cstat	186	.184413	.1735339	.0127241
placebo	Cstat	198	.155878	.1317561	.0093635

One-Sample Test

		Test Value = 0					
						95% Confidence Interval of the Difference	
group		t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
alcohol	Cstat	14.493	185	.000	.1844133	.159310	.209516
placebo	Cstat	16.647	197	.000	.1558780	.137412	.174344

Descriptives

group				Statistic	Std. Error
alcohol	Cstat	Mean		.184413	.0127241
		95% Confidence Interval for Mean	Lower Bound	.159310	
			Upper Bound	.209516	
		5% Trimmed Mean		.166143	
		Median		.124564	
		Variance		.030	
		Std. Deviation		.1735339	
		Minimum		.0039	
		Maximum		.7440	
		Range		.7401	
		Interquartile Range		.1678	
		Skewness		1.587	.178
		Kurtosis		1.813	.355
placebo	Cstat	Mean		.155878	.0093635
		95% Confidence Interval for Mean	Lower Bound	.137412	
			Upper Bound	.174344	
		5% Trimmed Mean		.142436	
		Median		.116500	
		Variance		.017	
		Std. Deviation		.1317561	
		Minimum		.0040	
		Maximum		.7095	
		Range		.7055	
		Interquartile Range		.1455	
		Skewness		1.677	.173
		Kurtosis		3.240	.344

Raw Calibration Data

Type III Tests of Fixed Effects[a]

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	64	61.790	.000
OverUnder	5	320	125.825	.000
group	1	64	1.043	.311
group * OverUnder	5	320	.372	.868

a. Dependent Variable: OU.

1. group[a]

group	Mean	Std. Error	df	95% Confidence Interval	
				Lower Bound	Upper Bound
alcohol	.175	.028	64	.119	.232
placebo	.135	.027	64	.080	.190

a. Dependent Variable: OU.

Estimates[a]

group	OverUnder	Mean	Std. Error	df	95% Confidence Interval	
					Lower Bound	Upper Bound
alcohol	1	-.008	.037	175.334	-.082	.066
	2	.478	.037	175.334	.404	.552
	3	.324	.037	175.334	.250	.398
	4	-.086	.037	175.334	-.159	-.012
	5	.239	.037	175.334	.165	.313
	6	.104	.037	175.334	.030	.178
placebo	1	-.049	.036	175.334	-.121	.022
	2	.439	.036	175.334	.368	.511
	3	.259	.036	175.334	.187	.330
	4	-.099	.036	175.334	-.171	-.027
	5	.222	.036	175.334	.151	.294
	6	.037	.036	175.334	-.035	.109

a. Dependent Variable: OU.

Univariate Tests[a]

OverUnder	Numerator df	Denominator df	F	Sig.
1	1	175.334	.629	.429
2	1	175.334	.556	.457
3	1	175.334	1.546	.215
4	1	175.334	.066	.797
5	1	175.334	.102	.750
6	1	175.334	1.642	.202

Each F tests the simple effects of group within each level combination of the other effects shown. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.[a]

a. Dependent Variable: OU.

Type III Tests of Fixed Effects[a]

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	64	443.035	.000
CalibrationStat	5	320.000	74.295	.000
group	1	64	3.115	.082
group * CalibrationStat	5	320.000	.953	.447

a. Dependent Variable: Cstat.

1. CalibrationStat[a]

CalibrationStat	Mean	Std. Error	df	95% Confidence Interval	
				Lower Bound	Upper Bound
1	.093	.014	328.217	.065	.121
2	.361	.014	328.217	.333	.390
3	.227	.014	328.217	.199	.255
4	.063	.014	328.217	.035	.091
5	.173	.014	328.217	.145	.202
6	.102	.014	328.217	.074	.130

a. Dependent Variable: Cstat.

2. group[a]

group	Mean	Std. Error	df	95% Confidence Interval	
				Lower Bound	Upper Bound
alcohol	.184	.012	64	.161	.208
placebo	.156	.011	64	.133	.178

a. Dependent Variable: Cstat.

Estimates[a]

group	CalibrationStat	Mean	Std. Error	df	95% Confidence Interval	
					Lower Bound	Upper Bound
alcohol	1	.094	.021	328.217	.054	.134
	2	.389	.021	328.217	.348	.429
	3	.256	.021	328.217	.215	.296
	4	.063	.021	328.217	.022	.103
	5	.191	.021	328.217	.151	.232
	6	.114	.021	328.217	.074	.154
placebo	1	.093	.020	328.217	.053	.132
	2	.334	.020	328.217	.295	.373
	3	.199	.020	328.217	.160	.238
	4	.064	.020	328.217	.025	.103
	5	.156	.020	328.217	.116	.195
	6	.090	.020	328.217	.051	.129

a. Dependent Variable: Cstat.

Pairwise Comparisons[a]

CalibrationStat	(I) group	(J) group	Mean Difference (I-J)	Std. Error	df	Sig.[c]	95% Confidence Interval for Difference[c]	
							Lower Bound	Upper Bound
1	alcohol	placebo	.001	.029	328.217	.961	-.055	.058
	placebo	alcohol	-.001	.029	328.217	.961	-.058	.055
2	alcohol	placebo	.054	.029	328.217	.058	-.002	.111
	placebo	alcohol	-.054	.029	328.217	.058	-.111	.002
3	alcohol	placebo	.057*	.029	328.217	.047	.001	.113
	placebo	alcohol	-.057*	.029	328.217	.047	-.113	-.001
4	alcohol	placebo	-.001	.029	328.217	.968	-.057	.055
	placebo	alcohol	.001	.029	328.217	.968	-.055	.057
5	alcohol	placebo	.036	.029	328.217	.212	-.020	.092
	placebo	alcohol	-.036	.029	328.217	.212	-.092	.020
6	alcohol	placebo	.024	.029	328.217	.405	-.032	.080
	placebo	alcohol	-.024	.029	328.217	.405	-.080	.032

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Dependent Variable: Cstat.

c. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests[a]

CalibrationStat	Numerator df	Denominator df	F	Sig.
1	1	328.217	.002	.961
2	1	328.217	3.628	.058
3	1	328.217	3.982	.047
4	1	328.217	.002	.968
5	1	328.217	1.566	.212
6	1	328.217	.694	.405

Each F tests the simple effects of group within each level combination of the other effects shown. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.[a]

a. Dependent Variable: Cstat.

Type III Tests of Fixed Effects[a]

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	57.861	287.820	.000
EmotionType	5	304.140	29.298	.000
group	1	57.861	12.297	.001
group * EmotionType	5	304.140	1.249	.286

a. Dependent Variable: emotion.

1. EmotionType[a]

EmotionType	Mean	Std. Error	df	95% Confidence Interval	
				Lower Bound	Upper Bound
1	.151	.027	369.998	.097	.204
2	.140	.028	369.998	.086	.195
3	.108	.027	369.998	.055	.161
4	.490	.028	369.998	.435	.545
5	.081	.027	369.997	.028	.133
6	.165	.027	369.997	.113	.218

a. Dependent Variable: emotion.

2. group[a]

group	Mean	Std. Error	df	95% Confidence Interval	
				Lower Bound	Upper Bound
alcohol	.150	.016	56.381	.118	.182
placebo	.228	.016	59.445	.197	.260

a. Dependent Variable: emotion.

Estimates[a]

group	EmotionType	Mean	Std. Error	df	95% Confidence Interval	
					Lower Bound	Upper Bound
alcohol	1	.135	.039	369.998	.058	.211
	2	.087	.039	369.998	.011	.164
	3	.086	.038	369.997	.011	.162
	4	.398	.040	369.998	.320	.476
	5	.072	.038	369.997	-.003	.148
	6	.122	.038	369.997	.046	.197
placebo	1	.166	.038	369.998	.091	.242
	2	.194	.039	369.998	.117	.270
	3	.130	.038	369.998	.055	.204
	4	.582	.040	369.999	.504	.660
	5	.090	.037	369.997	.017	.163
	6	.208	.037	369.997	.135	.282

a. Dependent Variable: emotion.

Pairwise Comparisons[a]

EmotionType	(I) group	(J) group	Mean Difference (I-J)	Std. Error	df	Sig.[c]	95% Confidence Interval for Difference[c]	
							Lower Bound	Upper Bound
1	alcohol	placebo	-.032	.055	369.998	.563	-.139	.076
	placebo	alcohol	.032	.055	369.998	.563	-.076	.139
2	alcohol	placebo	-.106	.055	369.998	.055	-.215	.002
	placebo	alcohol	.106	.055	369.998	.055	-.002	.215
3	alcohol	placebo	-.043	.054	369.998	.422	-.149	.063
	placebo	alcohol	.043	.054	369.998	.422	-.063	.149
4	alcohol	placebo	-.184*	.056	369.998	.001	-.294	-.073
	placebo	alcohol	.184*	.056	369.998	.001	.073	.294
5	alcohol	placebo	-.018	.053	369.997	.742	-.123	.088
	placebo	alcohol	.018	.053	369.997	.742	-.088	.123
6	alcohol	placebo	-.087	.053	369.997	.105	-.192	.018
	placebo	alcohol	.087	.053	369.997	.105	-.018	.192

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Dependent Variable: emotion.

c. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests[a]

EmotionType	Numerator df	Denominator df	F	Sig.
1	1	369.998	.336	.563
2	1	369.998	3.706	.055
3	1	369.998	.646	.422
4	1	369.998	10.714	.001
5	1	369.997	.108	.742
6	1	369.997	2.634	.105

Each F tests the simple effects of group within each level combination of the other effects shown. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.[a]

a. Dependent Variable: emotion.

Transformed Calibration Data

Type III Tests of Fixed Effects[a]

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	64.000	12334.799	.000
Emotion	5	320.000	123.832	.000
group	1	64.000	.584	.447
group * Emotion	5	320.000	.442	.819

a. Dependent Variable: OUtransformed.

1. group[a]

group	Mean	Std. Error	df	95% Confidence Interval	
				Lower Bound	Upper Bound
alcohol	.469	.006	64.000	.457	.481
placebo	.475	.006	64.000	.463	.487

a. Dependent Variable: OUtransformed.

2. Emotion[a]

Emotion	Mean	Std. Error	df	95% Confidence Interval	
				Lower Bound	Upper Bound
1	.512	.006	173.621	.501	.523
2	.488	.006	173.621	.477	.499
3	.411	.006	173.621	.400	.422
4	.526	.006	173.621	.515	.537
5	.452	.006	173.621	.441	.463
6	.443	.006	173.621	.432	.454

a. Dependent Variable: OUtransformed.

Estimates[a]

group	Emotion	Mean	Std. Error	df	95% Confidence Interval	
					Lower Bound	Upper Bound
alcohol	1	.508	.008	173.621	.492	.524
	2	.481	.008	173.621	.465	.497
	3	.409	.008	173.621	.393	.425
	4	.525	.008	173.621	.509	.541
	5	.452	.008	173.621	.436	.467
	6	.437	.008	173.621	.421	.453
placebo	1	.516	.008	173.621	.501	.532
	2	.495	.008	173.621	.480	.510
	3	.412	.008	173.621	.397	.428
	4	.527	.008	173.621	.512	.543
	5	.452	.008	173.621	.437	.468
	6	.448	.008	173.621	.433	.463

a. Dependent Variable: OUtransformed.

Pairwise Comparisons[a]

group	(I) Emotion	(J) Emotion	Mean Difference (I-J)	Std. Error	df	Sig.[c]	95% Confidence Interval for Difference[c]	
							Lower Bound	Upper Bound
alcohol	1	2	.027*	.008	320.000	.001	.011	.043
		3	.099*	.008	320.000	.000	.083	.115
		4	-.017*	.008	320.000	.036	-.033	-.001
		5	.057*	.008	320.000	.000	.041	.072
		6	.071*	.008	320.000	.000	.055	.087
	2	1	-.027*	.008	320.000	.001	-.043	-.011
		3	.072*	.008	320.000	.000	.056	.088
		4	-.044*	.008	320.000	.000	-.060	-.028
		5	.030*	.008	320.000	.000	.014	.046
		6	.044*	.008	320.000	.000	.028	.060
	3	1	-.099*	.008	320.000	.000	-.115	-.083
		2	-.072*	.008	320.000	.000	-.088	-.056
		4	-.116*	.008	320.000	.000	-.132	-.100
		5	-.042*	.008	320.000	.000	-.058	-.026
		6	-.028*	.008	320.000	.001	-.044	-.012
	4	1	.017*	.008	320.000	.036	.001	.033
		2	.044*	.008	320.000	.000	.028	.060
		3	.116*	.008	320.000	.000	.100	.132
		5	.074*	.008	320.000	.000	.058	.089
		6	.088*	.008	320.000	.000	.072	.104
	5	1	-.057*	.008	320.000	.000	-.072	-.041
		2	-.030*	.008	320.000	.000	-.046	-.014
		3	.042*	.008	320.000	.000	.026	.058
		4	-.074*	.008	320.000	.000	-.089	-.058
		6	.014	.008	320.000	.077	-.002	.030
	6	1	-.071*	.008	320.000	.000	-.087	-.055
		2	-.044*	.008	320.000	.000	-.060	-.028
		3	.028*	.008	320.000	.001	.012	.044
		4	-.088*	.008	320.000	.000	-.104	-.072
		5	-.014	.008	320.000	.077	-.030	.002
placebo	1	2	.021*	.008	320.000	.007	.006	.037
		3	.104*	.008	320.000	.000	.089	.120
		4	-.011	.008	320.000	.168	-.026	.005
		5	.064*	.008	320.000	.000	.049	.080
		6	.068*	.008	320.000	.000	.053	.084
	2	1	-.021*	.008	320.000	.007	-.037	-.006
		3	.083*	.008	320.000	.000	.067	.098
		4	-.032*	.008	320.000	.000	-.048	-.017
		5	.043*	.008	320.000	.000	.027	.058
		6	.047*	.008	320.000	.000	.032	.062
	3	1	-.104*	.008	320.000	.000	-.120	-.089
		2	-.083*	.008	320.000	.000	-.098	-.067
		4	-.115*	.008	320.000	.000	-.131	-.100
		5	-.040*	.008	320.000	.000	-.055	-.025
		6	-.036*	.008	320.000	.000	-.051	-.020
	4	1	.011	.008	320.000	.168	-.005	.026
		2	.032*	.008	320.000	.000	.017	.048
		3	.115*	.008	320.000	.000	.100	.131
		5	.075*	.008	320.000	.000	.060	.091
		6	.079*	.008	320.000	.000	.064	.095
	5	1	-.064*	.008	320.000	.000	-.080	-.049
		2	-.043*	.008	320.000	.000	-.058	-.027
		3	.040*	.008	320.000	.000	.025	.055
		4	-.075*	.008	320.000	.000	-.091	-.060
		6	.004	.008	320.000	.587	-.011	.020
	6	1	-.068*	.008	320.000	.000	-.084	-.053
		2	-.047*	.008	320.000	.000	-.062	-.032
		3	.036*	.008	320.000	.000	.020	.051
		4	-.079*	.008	320.000	.000	-.095	-.064
		5	-.004	.008	320.000	.587	-.020	.011

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Dependent Variable: OUtransformed.

c. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests[a]

group	Numerator df	Denominator df	F	Sig.
alcohol	5	320.000	59.198	.000
placebo	5	320.000	65.266	.000

Each F tests the simple effects of Emotion within each level combination of the other effects shown. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.[a]

a. Dependent Variable: OUtransformed.

Type III Tests of Fixed Effects[a]

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	64.000	95312.943	.000
CalibrationStat	5	320.000	78.719	.000
group	1	64.000	2.841	.097
group * CalibrationStat	5	320.000	.812	.542

a. Dependent Variable: CStat.

1. CalibrationStat[a]

CalibrationStat	Mean	Std. Error	df	95% Confidence Interval	
				Lower Bound	Upper Bound
1	.478	.003	336.178	.473	.483
2	.426	.003	336.178	.421	.431
3	.451	.003	336.178	.446	.456
4	.485	.003	336.178	.479	.490
5	.461	.003	336.178	.456	.466
6	.476	.003	336.178	.471	.482

a. Dependent Variable: CStat.

2. group[a]

group	Mean	Std. Error	df	95% Confidence Interval	
				Lower Bound	Upper Bound
alcohol	.460	.002	64.000	.456	.465
placebo	.465	.002	64.000	.461	.470

a. Dependent Variable: CStat.

Estimates[a]

group	CalibrationStat	Mean	Std. Error	df	95% Confidence Interval	
					Lower Bound	Upper Bound
alcohol	1	.478	.004	336.178	.470	.486
	2	.422	.004	336.178	.414	.430
	3	.446	.004	336.178	.438	.453
	4	.485	.004	336.178	.477	.493
	5	.458	.004	336.178	.450	.465
	6	.474	.004	336.178	.466	.481
placebo	1	.478	.004	336.178	.471	.486
	2	.430	.004	336.178	.422	.437
	3	.457	.004	336.178	.449	.464
	4	.485	.004	336.178	.477	.492
	5	.465	.004	336.178	.457	.472
	6	.479	.004	336.178	.471	.486

a. Dependent Variable: CStat.

Pairwise Comparisons[a]

CalibrationStat	(I) group	(J) group	Mean Difference (I-J)	Std. Error	df	Sig.[c]	95% Confidence Interval for Difference[c]	
							Lower Bound	Upper Bound
1	alcohol	placebo	.000	.005	336.178	.979	-.011	.011
	placebo	alcohol	.000	.005	336.178	.979	-.011	.011
2	alcohol	placebo	-.008	.005	336.178	.153	-.018	.003
	placebo	alcohol	.008	.005	336.178	.153	-.003	.018
3	alcohol	placebo	-.011*	.005	336.178	.043	-.022	.000
	placebo	alcohol	.011*	.005	336.178	.043	.000	.022
4	alcohol	placebo	.000	.005	336.178	.954	-.010	.011
	placebo	alcohol	.000	.005	336.178	.954	-.011	.010
5	alcohol	placebo	-.007	.005	336.178	.211	-.017	.004
	placebo	alcohol	.007	.005	336.178	.211	-.004	.017
6	alcohol	placebo	-.005	.005	336.178	.360	-.016	.006
	placebo	alcohol	.005	.005	336.178	.360	-.006	.016

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Dependent Variable: CStat.

c. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests[a]

CalibrationStat	Numerator df	Denominator df	F	Sig.
1	1	336.178	.001	.979
2	1	336.178	2.052	.153
3	1	336.178	4.146	.043
4	1	336.178	.003	.954
5	1	336.178	1.568	.211
6	1	336.178	.842	.360

Each F tests the simple effects of group within each level combination of the other effects shown. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.[a]

a. Dependent Variable: CStat.

Type III Tests of Fixed Effects[a]

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	58.102	54082.114	.000
EmotionType	5	304.544	27.018	.000
group	1	58.102	12.355	.001
group * EmotionType	5	304.544	1.087	.368

a. Dependent Variable: emotion.

1. EmotionType[a]

EmotionType	Mean	Std. Error	df	95% Confidence Interval	
				Lower Bound	Upper Bound
1	.468	.005	369.966	.458	.478
2	.470	.005	369.969	.461	.480
3	.477	.005	369.961	.467	.486
4	.410	.005	369.974	.400	.420
5	.483	.005	369.958	.473	.492
6	.466	.005	369.958	.457	.476

a. Dependent Variable: emotion.

2. group[a]

group	Mean	Std. Error	df	95% Confidence Interval	
				Lower Bound	Upper Bound
alcohol	.469	.003	56.583	.464	.475
placebo	.455	.003	59.728	.450	.461

a. Dependent Variable: emotion.

Estimates[a]

group	EmotionType	Mean	Std. Error	df	95% Confidence Interval	
					Lower Bound	Upper Bound
alcohol	1	.471	.007	369.964	.457	.485
	2	.480	.007	369.964	.466	.494
	3	.481	.007	369.958	.468	.495
	4	.426	.007	369.970	.412	.440
	5	.484	.007	369.958	.470	.498
	6	.474	.007	369.958	.460	.488
placebo	1	.465	.007	369.968	.451	.479
	2	.460	.007	369.974	.447	.474
	3	.472	.007	369.964	.458	.485
	4	.395	.007	369.977	.381	.409
	5	.481	.007	369.958	.468	.495
	6	.458	.007	369.958	.445	.471

a. Dependent Variable: emotion.

Pairwise Comparisons[a]

EmotionType	(I) group	(J) group	Mean Difference (I-J)	Std. Error	df	Sig.[c]	95% Confidence Interval for Difference[c]	
							Lower Bound	Upper Bound
1	alcohol	placebo	.006	.010	369.966	.576	-.014	.025
	placebo	alcohol	-.006	.010	369.966	.576	-.025	.014
2	alcohol	placebo	.020*	.010	369.969	.047	.000	.040
	placebo	alcohol	-.020*	.010	369.969	.047	-.040	.000
3	alcohol	placebo	.009	.010	369.961	.338	-.010	.028
	placebo	alcohol	-.009	.010	369.961	.338	-.028	.010
4	alcohol	placebo	.031*	.010	369.974	.003	.011	.051
	placebo	alcohol	-.031*	.010	369.974	.003	-.051	-.011
5	alcohol	placebo	.003	.010	369.958	.790	-.016	.022
	placebo	alcohol	-.003	.010	369.958	.790	-.022	.016
6	alcohol	placebo	.016	.010	369.958	.104	-.003	.035
	placebo	alcohol	-.016	.010	369.958	.104	-.035	.003

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Dependent Variable: emotion.

c. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests[a]

EmotionType	Numerator df	Denominator df	F	Sig.
1	1	369.966	.313	.576
2	1	369.969	3.975	.047
3	1	369.961	.919	.338
4	1	369.974	9.180	.003
5	1	369.958	.071	.790
6	1	369.958	2.655	.104

Each F tests the simple effects of group within each level combination of the other effects shown. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.[a]

a. Dependent Variable: emotion.